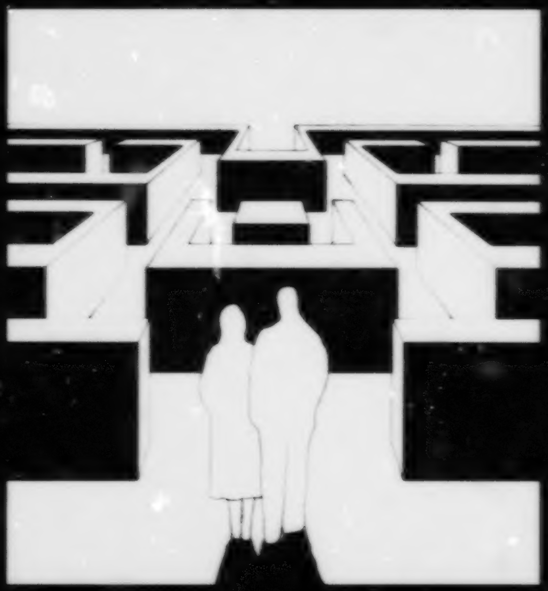
Reforming Capital Income Taxation in Canada

Efficiency and Distributional Effects of Alternative Options



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Reforming Capital Income Taxation in Canada

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Foreword

This paper is one of the outputs from Council's three year study of the taxation of capital income – or of the income derived from savings and investment. The study program had important dimensions in both time and space. The effects of capital taxation on both present and future output and standards of living were scrutinized. Taxes levied by all levels of Canadian government were studied as were the international implications of the taxation of capital income. Another important emphasis in the study program was on the interrelationship among specific measures of capital taxation. Here, general equilibrium and other techniques were used to examine the various measures as an interrelated system. Separate studies were also undertaken of specific measures of capital taxation including the personal and corporate income taxes, sales and transactions taxes, property taxes, and resource taxes.

The present study evaluates two main options for capital income tax reform in Canada – a lifetime consumption tax, and a uniform income tax. It constitutes a comprehensive survey of the theory and evidence on the likely effects of the alternative tax reforms on economic welfare and the distribution of income.

Judith Maxwell
Chairman

1 Introduction

There is currently considerable public concern over the state of Canada's personal and corporate income tax systems. These are widely considered to be too complex and unfair. High-income taxpayers are believed to have access to numerous loopholes, while small businessmen and others struggle to cope with a system that is hard to understand and imposes inordinate compliance costs.

At the same time that there is public dissatisfaction with the income tax systems, there is a growing interest in tax reform among economists. This is based partly on concerns similar to those of the broader public over equity, but also on a view that the current system reduces national income by its effects on economic behaviour. It is believed that we have a haphazard and inefficient system of capital income taxation that misallocates capital across the industries and sectors of our economy, and also distorts saving and investment decisions.

The present study explores options for the reform of capital income taxation in Canada. The two major approaches are lifetime consumption taxation (CT) and comprehensive or uniform income taxation (UIT). The study shows how these could be implemented via specific changes in the tax system and considers the theory and evidence that is already available on the likely economic effects of these alternative reforms. Desirability of the reforms is assessed in relation to the three basic criteria commonly used to evaluate tax systems: equity, efficiency, and simplicity. The impact of each option is examined not only in the steady state, where a reform has been fully phased in, but also to a significant extent in the transition to that steady state although we do not explore fully the transitional arrangements that would be required in the course of implementing either CT or UIT reform.

Perhaps the most important conclusion of this study is that, on efficiency and simplicity grounds, the CT approach appears to dominate the UIT approach at the level of personal taxation. While simplicity is also a factor favouring the CT approach for firms and corporations, there are efficiency considerations related to the open economy that may make it desirable to levy some form of tax on the use of capital in the Canadian economy.

The efficiency argument for the superiority of CT rests on the fact that, unlike an income tax, it does not put a wedge between the before-tax and after-tax rates of return on saving and investment. In a closed economy this will generally mean that CT encourages a higher level of capital accumulation, which is almost certainly desirable on efficiency grounds if, as is often argued, our capital/labour ratios are far below the golden-rule level. The golden-rule capital intensity is such that steady-state consumption is maximized.

Of course, Canada is not usefully modeled as a closed economy, particularly with respect to capital markets. This alters the efficiency argument for CT significantly. One of the most important consequences is an analytical separation between the taxation of capital *use* at the firm level and capital income at the individual level. (In a closed economy, a well-known proposition in public finance says that the two forms of taxation are equivalent.)

Canada is essentially a taker of world interest rates. At the individual level, this means that the CT approach to personal taxation allows individuals to trade off present consumption for future consumption at the rate offered by world markets. This does not guarantee the superiority of CT on efficiency grounds at the individual level – as we shall see, CT would worsen the labour/leisure distortion in the initial implementation period relative to UIT – but we will argue, based on available evidence, that the net effect is in favour of CT.

A second consequence of the fact that Canada may be thought of as a taker of world interest rates is encountered at the firm level, provided we can assume that Canada is a small open economy. (This assumption removes the possibility of terms of trade effects, as discussed below.) Ignoring the effects of foreign tax systems, the full CT approach at firm level would remove all taxes on the use of capital. This removal would ensure that the rate of return on investment in Canada would correspond, in equilibrium, with the rate of return on world capital markets. That is, the abolition of capital income taxes in Canada would ensure our efficient utilization of international capital markets.

Although a pure CT approach appears attractive on efficiency grounds in a "first-best" open-economy setting, there are "second-best" arguments for capital income taxation that arise. One of these involves taxing capital use as a substitute for tariff policy. (Taxing capital use reduces capital inflows and raises the exchange rate in the long run if we have any influence on world commodity prices – i.e., the economy is open but not small.) While this is a novel, and as yet imperfectly studied argument, there is a further argument for taxing the use of capital that has been around for a long time. Subsidiaries of foreign multinationals typically obtain a credit for Canadian taxes towards their home-country corporate income tax (CIT) liability. Therefore reductions in Canadian CIT, for instance, can have a substantial "treasury transfer effect": foreign treasuries increase their revenues at the expense of ours, with no net change, it is believed, in the effective taxation of foreign subsidiaries, and thus no incentive effect on them. However, the importance of this effect has been seriously questioned recently. It has been suggested that the effective tax rate on foreign subsidiaries is typically the Canadian CIT rate, so that reductions in our taxes have a stimulative effect on foreign subsidiaries as well as domestic firms. This is an area where research is just beginning, and where more conclusive evidence is definitely needed.

The simplicity of CT lies largely in the lack of any need to measure or tax capital income. For ideal implementation of the UIT approach, all forms of capital income must be taxed on an annual accrual basis, and in real rather than nominal terms. Thus, to implement the strict income tax approach it would be necessary to tax fully real capital gains accruing each year, include net imputed rent on owner-occupied houses as part of income for tax purposes, and "inflation proof" the provisions for interest deductibility, depreciation, and taxation of capital gains on inventory. The CT approach does away with these difficulties at a stroke without, in our judgment, introducing practical difficulties that are at all comparable.

While we believe that some fairly definite conclusions can be drawn about the relative desirability of the two major reform options in terms of efficiency and simplicity, when we turn to equity the situation becomes much more complex. This is particularly true since one has to consider the equity implications of the alternatives not only when they are fully phased in – that is, in the new steady state – but along the transition path to that new steady state. Moreover, the equity characteristics of the alternatives depend critically on the particular arrangements that are made for the phasing-in of the new system. Finally, since the impact of these reforms would be felt differentially by the members of different cohorts alive today, as well as unborn future generations, important questions of intergenerational equity also arise.

Whether one regards consumption or comprehensive income as providing a better measure of the "ability to pay" determines which tax base one believes would provide equal treatment of equals – that is, horizontal equity – in an ideal world. Conceivably, however, one might not advocate a real-world move to the base that would embody horizontal equity in an ideal world if, in order to get the right tax base, one might have to sacrifice vertical equity, or put up with horizontal inequity on the transition path. We believe that, to a large extent, with the correct transitional arrangements and rate structure, it would not be necessary to discard one's ideal tax base for such reasons. However, it is imperative to note that this depends on very careful tax design. If such careful design cannot be implemented, then it could be wisest to abandon the theoretically ideal approach. We try to show that this statement applies equally whether one's ideal is the CT or UIT approach.

The study is organized as follows. This chapter provides a general discussion of desirable features of tax systems and how actual systems diverge from the ideal. It also sets out the essential motivations for CT and UIT reforms. Chapter 2 briefly reviews the current tax treatment of capital income in Canada. In Chapter 3, the central issues in the design and implementation of the major reform options are addressed. This is followed by a detailed discussion in Chapter 4 of the efficiency effects of alternative reforms. Chapter 5 puts the analysis into an open-economy framework, which turns out to have important implications for both UIT and CT reforms. Then, in Chapters 6, 7, and 8, the impacts of capital income tax reform on human capital, income distribution, and intergenerational transfers are considered. Chapter 9 brings together the discussion and reviews the central conclusions.

The Desirable Characteristics of a Tax System

Economists and tax practitioners are agreed that there are three broad criteria that should be used in evaluating tax systems. These are equity, efficiency, and simplicity. They are also agreed that there are numerous trade-offs between these goals: a tax reform believed to improve equity may reduce efficiency or simplicity, for example. However, they are not agreed about the circumstances under which a tax system is equitable or about the severity of the trade-offs between the different goals.

Equity

Suppose it has been determined that taxes should be positively related to some measure of the "ability to pay."

The latter could be income, consumer expenditure, wealth, or some combination of these. Then two aspects of equity for the members of a single generation can be identified. "Horizontal" equity is obtained when taxpaying units with equal ability to pay bear the same amount of tax. "Vertical" equity holds when tax burdens for those with differing ability to pay are considered to be fair. (Note that the use of the ability-to-pay concept clearly implies that those with higher ability to pay should pay larger taxes.)

We are unfortunately unlikely to win agreement about whether a particular tax system achieves horizontal or vertical equity. One might suppose that if taxpayers of the same age, health, family circumstances, etc., and the same income always paid the same tax, horizontal equity would be satisfied. However, as pointed out earlier, some would argue in favour of equal burdens for taxpayers with equal *expenditure*. Vertical equity is even less likely to be assessed uniformly by different observers. Tax burdens may be positively related to the ability to pay and, at the same time, exhibit progressivity, proportionality, or even regressivity.[1]

Concepts of equity in taxation become even less well-defined when the intergenerational dimension is brought into play. When age differences among the current population and the implications of our actions for unborn future generations are considered, the notions of horizontal and vertical equity become considerably more complicated.

In a static context, once an ideal tax base is chosen, the notion of horizontal equity is straightforward. This is partly because the taxpayers benefit from a range of government programs and expenditures that, although they may not provide the same payoffs for all, provide a constant background against which equity can be evaluated. When we bring in intergenerational considerations, however, we must take account of the fact that the scale of government activities varies over time. If, for example, this scale is holding steady while real incomes are rising, then lower tax rates ought perhaps to be applied to members of later generations. On the other hand, if the scale of government activities is rising at the same rate as aggregate income and wealth, we may want different cohorts to pay tax at the same rate. Finally, if the relative size of government is increasing, as has been the case over the 20th century, then we might want to tax the members of later generations at higher rates.

Considerations of intergenerational equity have a practical effect on tax design. For example, it may be viewed as a virtue of taxation on an *annual* basis that if tax burdens were computed strictly according to current income or expenditure, there would be a tendency for one's total lifetime tax rate to depend on the average scale of government activities over one's lifetime. These issues are also clearly relevant for those schemes – for example, that proposed by the U.S. Treasury (1977) – that attempt to levy taxes on the basis of lifetime income or expenditure. Implementation of such schemes in such a way as to get equity across, as well as within, cohorts is a difficult problem, which has received little attention.

Efficiency

The concept of efficiency, in contrast to that of equity, is objective. When economists say that a situation is efficient, they mean that no change is possible that would make at least some people better off without making anyone else worse off. For instance, under many circumstances it is inefficient to let a machine or a worker stand idle. If additional resources are put to work, total income will increase and it is, therefore, possible to make everyone better off. More subtly, inefficiency arises if too much of one factor of production (capital, labour, land, or natural resources) is being used in one line of production, and too little in another. It would be possible to increase the output in *both* lines of production by reallocating the factor from the line where too much is being used to the one where too little is being used. (And, therefore, it would be possible to expand everyone's consumption of both commodities.)

In the absence of government and externalities,[2] a competitive economy with a complete set of markets would exhibit efficiency in equilibrium. The following three conditions, which are required for efficiency, would be satisfied:

1) Efficiency in exchange — All consumers will face the same prices. Since each consumer will purchase a product up to the point where the benefit from an extra unit's consumption just falls to the price, identical prices for all consumers mean that the marginal benefit obtained from the consumption of the last unit of any given good will be the same for all. This implies that there is no way the equilibrium outputs of the various goods could be redistributed among consumers without making some worse off.

2) Efficiency in production — In competitive equilibrium, factor services will be used up to the point where the value of increased output that can be produced by using an extra unit of a factor will fall to the price of that factor service. (The value of the marginal product of labour, for example, would equal the wage rate.) Since the

price of a factor service will be the same to all users, the value of the marginal product for any factor will be the same throughout the economy. This implies that the allocation of that factor is efficient – reallocation could not increase the value of total output.

3) Overall efficiency — Finally, in competitive equilibrium, prices of goods reflect their true marginal social costs, so that by consuming any particular good up to the point where marginal benefit falls to price, individuals will ensure that (at the margin) the benefits to society from further production of any good will equal the costs. No gains from reducing the output of one good and increasing that of another could be achieved.

How do the above conditions, formulated in terms of a closed economy, extend to the open-economy situation? The answer is straightforward if the economy in question is small, that is, it cannot affect world prices for any commodity. In that case, the only modification to the above analysis is to note that for traded commodities, marginal costs refer either to marginal domestic production costs or to the world price. (Extra units of a traded commodity can be generated either by increased domestic production or by imports.) If the country in question *can* affect world prices, then there is in principle an optimal tariff structure. Discussion of this structure is beyond the scope of this study.

For our purposes it is important to ask how the above static efficiency conditions apply to saving and investment. At first glance the application seems straightforward. Thinking of future consumption simply as another commodity, shouldn't overall intertemporal efficiency be satisfied if individuals face relative prices for consumption at different times equal to the relative costs of providing consumption at those times? In other words, shouldn't individuals' marginal rates of time preference equal the market interest rate? And, since this condition is met with perfect capital markets, doesn't competitive equilibrium guarantee intertemporal, as well as static, efficiency?

In fact, as is well known, competitive equilibrium does not guarantee "dynamic efficiency" in a closed economy. Due to difficulties pointed out by Malinvaud (1953) and Samuelson (1958), the free-market economy may converge to a suboptimal balanced growth path.[3] It may be possible to make the members of all generations better off by moving to another growth path with either higher or lower capital intensity. This is always true, for example, if competitive equilibrium leads to a capital/labour ratio in excess of the golden-rule level. The golden rule specifies the capital/labour ratio at which consumption is maximized. If capital intensity is above this level, an efficiency gain can be achieved simply by increasing consumption in all periods.

Intertemporal efficiency in a small open economy has quite different requirements than in a closed economy. It is not difficult to show (see Chapter 5) that there is a uniquely desirable capital/labour ratio. Optimal capital intensity is determined by using capital up to the point where its rate of return in domestic industry equals the cost of capital in the world market. This is a straightforward wealth-maximizing efficiency criterion.

With a uniquely determined efficient level for the capital stock, half of the intertemporal efficiency problem is solved. The other half of the problem concerns personal saving. Since individuals in a small open economy have a fixed rate at which they can transform present consumption into future consumption, given by the world interest rate, there is no difficulty in specifying the efficiency requirement. As long as individuals' marginal rates of time preference equal the world interest rate, intertemporal consumption choice is being conducted efficiently.

Thus, with respect to intertemporal efficiency, the small open economy is a much simpler world than a closed economy. Competitive conditions guarantee efficiency both in the use of capital in domestic industry and in intertemporal consumption choice. This simple result is disturbed, just as in the case of static efficiency, if the open economy is large. In that case there are possible second-best arguments for using capital taxes to manipulate the terms of trade by reducing capital inflows, as discussed in Chapter 5.

The Interference of Taxes with Efficiency

It is almost inevitable that the imposition of taxes will disturb some of the conditions required for efficiency that have just been outlined.[4] This would not be true if lump-sum taxes – which do not affect relative prices and, therefore, do not create substitution effects – were available. An example of a true lump-sum tax would be a "poll tax," that is, a flat tax liability on all citizens, unrelated to income or other circumstances. Of course, such a tax is very unattractive on distributional grounds. Unfortunately, no true lump-sum tax that is both practicable and attractive from a distributional standpoint has been devised.

Let us consider some examples of distortions caused by tax systems. For the most part, taxes do not disturb efficiency in exchange as much as the other conditions. This is because they generally discriminate according to the type of good that is being produced or the type of input used, rather than according to who is the final consumer. There are many taxes on gasoline or liquor, for example, that certainly affect the prices of these goods, but all consumers pay the same price, so that the condition for efficiency in exchange is not violated.

In at least one important case, however, the tax system does interfere significantly with efficiency in exchange. To the extent that investment income is subject to tax, after-tax rates of return differ between individuals depending on their marginal tax rates. This means that the price of future consumption varies across taxpayers. Those with the highest marginal tax rates on investment income have the highest price and, therefore, the highest marginal benefit from future consumption. Everyone could be made better off, without any change in aggregate saving, if those with the high marginal tax rates could trade some of their current consumption for future consumption by exchanging with those who have low marginal tax rates.

Turning to efficiency in production, it has been argued, for example, that the corporate income tax effectively levies an extra tax on capital in the corporate sector.[5] This will lead to a situation where the marginal product of capital is higher in the corporate sector than elsewhere, so that an increase in the value of total output could be achieved by transferring some capital from the corporate to the noncorporate sector. Similar distortions may be caused by special treatment under CIT for small business, research and development expenditures, investment in certain regions, etc. Distortions of the allocation of labour may also be caused, for example, where some workers are not covered by unemployment insurance schemes, or where there are subsidies to employment in certain regions or of certain types of workers.

Overall efficiency is also disturbed by the tax system. The proportionality of marginal costs and marginal benefits of different goods and services will not hold, for example, if sales taxes are levied at different rates on different commodities, or if the burden of other taxes – property, corporate, and social security taxes – is greater in some industries than in others.[6] This is because these taxes create a wedge between marginal cost and price. Differences in tax rates across goods and services therefore imply that prices, and thus marginal benefits, are not proportional to marginal costs.

An important case where taxes disturb overall efficiency lies in the choice of hours of work (or leisure). Leisure is often thought of by economists as a commodity. Its price is the net wage income given up by taking an extra hour of leisure. An income tax reduces this price relative to the cost of other commodities – usually referred to simply as "goods." The consumer is given an artificially low price of leisure – one below its true cost by a fraction equal to the marginal income tax rate. This induces the consumer to take too much leisure relative to other goods. This is an effect that has received increasing attention and that will be discussed in detail in this study.

Finally, tax systems may of course interfere with overall intertemporal efficiency. In the small open-economy context, for example, taxation of investment income puts a wedge between the marginal cost of future consumption – determined by world interest rates – and the "price" charged the consumer. This means that marginal benefits of future consumption will be higher in relation to true marginal costs than is true for current consumption. Everyone could be made better off if some current consumption were transformed into future consumption.

Overall intertemporal efficiency has another important aspect, which has not been mentioned so far. Future consumption can be provided for by investment in many different forms – both physical and human. The marginal benefits of future consumption attained in these different ways are clearly the same, but the marginal costs are not. Those forms of investment most heavily discouraged by the tax system will provide artificially low-cost ways of increasing future consumption (from the point of view of society as a whole, although of course not from the point of view of the individual subject to tax). For overall efficiency their use should be increased, just as in the static case we would argue that where marginal costs are low relative to marginal benefits, production ought to be increased.

Simplicity

The desire for greater simplicity in taxation has recently increased strongly. The accumulation of special provisions and misconceived or incomplete reform episodes have generated an increasingly complex tax code. The proliferation of tax expenditures or loopholes has tended to lead to a narrowing of the tax base, which results in an increase in the rates to maintain revenues, leading to intensified efforts at avoidance, which absorb significant resources in socially unproductive tax planning.

Simplification has been perhaps the major theme of tax reform discussion in the United States in recent years. In the period 1982-85, the U.S. Congress considered a whole series of flat tax bills, including the Hall-Rabushka and Bradley-Gephardt plans, and the President ended by presenting a major proposal for tax reform (U.S. Treasury, 1985), embodying a number of the radical and simplifying reform proposals set out in an earlier document (U.S. Treasury, 1984). By mid-1986 the House and the Senate were negotiating a compromise tax reform bill in an attempt to reconcile competing bills in the two houses, both of which – like the President's proposal – embraced a modified flat-tax and a more comprehensive measure of income. Each of these proposals essentially promotes a more comprehensive definition of taxable income that, it is assumed, will yield greater simplicity. As we shall see below, this assumption is seriously questioned by many CT advocates. It is also curious to note the repeated emphasis on a compressed rate structure as an avenue towards greater simplicity. Complexity in the rate structure causes very little increase in administrative or compliance costs, unlike complexity in the tax base.

In Canada the need for simplicity received considerable attention in the report of the Carter Commission (Canada, 1966). Currently, there appears to be increased public interest in simplicity as a criterion for tax reform. This interest was reflected in the objectives stated in the May 23, 1985 federal budget speech.

Alternative Tax Bases

In the next chapter we will outline the current tax treatment of capital income in Canada. As will be shown, this treatment combines some of the features of an "income tax," a "consumption tax," and a "wage tax." The following section describes the main differences between these alternative taxes and provides some historical background on the origin and development of these concepts. How the alternative tax bases might be implemented, and their related advantages and disadvantages, are discussed in detail in later chapters.

Income

There have long been advocates of taxation on the basis of the ability to pay, and of annual income as the leading indicator of this ability. As Kaldor (1955) pointed out, over time the notion of income has become practically synonymous with taxable capacity.

Although the definition of income was originally the subject of some discussion, the notion of comprehensive income enunciated by Haig (1921) and Simons (1938) has been widely accepted for some time.[7] Comprehensive income is defined, on the "uses side," as the sum of current consumption plus additions to net worth or saving. On the "sources side," income is the sum of all real current additions to purchasing power. Such receipts include labour income, rents, dividends, interest, transfers, accrued capital gains, imputed rent, the value of household services, and gifts and inheritances. All these receipts must be measured net of expenditures that do not increase either consumption or wealth (e.g., costs of repairs and maintenance, operating a business, etc.).

The highly influential Carter Commission report made this concept of income the foundation for its proposals for major tax reform in Canada. In fact, the Commission's only major departure from this ideal concerned the treatment of capital gains, which were to be taxed on realization rather than accrual. The report of the Commission was received with praise from academics, not only in Canada but internationally as well, for its consistency, logic, and respect for the basic criteria of efficiency and equity (Harberger, 1968). However, as demonstrated by the Canadian experience in tax reform during and following the Carter Commission, many difficulties and questions arise in the implementation of a comprehensive income tax base. For instance, is it actually equitable to tax all sources of income in the same way? What about the technical and practical problems of measuring the various forms of imputed income (e.g., rent on owner-occupied housing) or of including gifts and inheritances in the tax base? The taxation of capital gains on accrual has been regarded as impracticable, while taxing on realization has created additional problems of equity and efficiency. Associated with these problems is the difficulty of achieving true integration of the personal and corporate income tax systems. Also, with fluctuating incomes, isn't there a need for at least short-term averaging in a progressive tax system based on annual income to avoid obvious horizontal inequities? And, if this is so, how can comprehensive annual income be regarded as the ideal indicator of the ability to pay? Furthermore, there is the issue of inflation and the problems associated with inflation proofing the measurement of all sources of income, particularly capital income.

The Carter Commission report led to the 1971 tax reform legislation in Canada. As St-Hilaire and Whalley (1985) point out, this legislation reflected the Carter proposals only to a limited degree. In light of some of the issues mentioned above, and due to the intricacies of the tax reform process itself, adjustments and compromises were made. The end result was a tax base continuing to fall considerably short of the Haig-Simons ideal. Even more revealing is the fact that following the 1971 legislation important modifications to the personal income tax system were effected, which were a further departure from the comprehensive income ideal and, it can be argued, were more compatible with a consumption tax approach. These modifications included the introduction of registered home ownership savings plans (RHOSP) in 1974, the $1,000 pension income deduction, and the $1,000 interest, dividends, and capital gains deduction in 1975. The November 1981 budget, which did aim at broadening the base, met with such fierce opposition that most of its proposals were never implemented.

The concept of comprehensive income taxation is an ideal still espoused by many in Canada and other countries. However, attempts to implement this ideal in actual tax systems have not been very successful. One may perhaps wonder if the perceived imperfections in the tax system, and the drift towards a consumption tax, are an indication that there is in fact considerably more popular support for a consumption tax approach than is generally believed.

Consumption

Advocacy of consumption taxation on the grounds that people should be taxed on what they consume rather than what they earn can be traced back to Hobbes in the 17th century (Kaldor, 1955). Many economists have since supported this form of taxation. Mill, for instance, argued that for the system of "income taxation" to be just, all savings should be exempt in order to avoid their double taxation. Marshall and Pigou also shared this view.

Although Mill, Marshall, Pigou, and others argued the merits of a personal expenditure tax on principle, they all believed that such a tax was impracticable. (Mill did argue, however, that sources of income that might generate more saving ought to bear less tax.) It was Fisher (1937) who first argued that consumption could indeed be taxed at the personal level via scrupulous measurement of income and saving. This marked the beginning of the breakdown of the view that personal expenditure taxation was impracticable.

In the United States, in 1942, the Treasury proposed to Congress a direct expenditure tax based on Fisher's model, but as a complement to, not a replacement for, the income tax. The measure, which was unanimously rejected by the members of the Senate Finance Committee, had been put forward as a solution for war finances (and as a means of restraining conspicuous consumption during wartime) rather than as a step towards tax reform. The possibility of implementing an expenditure tax in the United States was not to be reconsidered for some time.

Kaldor's classic study of the expenditure tax (1955) argued for the expenditure tax largely on the basis of the failure of income as a measure of taxable capacity to account for spending power achieved through dissaving, which in fact greatly favours property owners. Kaldor also drew attention to the inequities caused by the differential treatment of different sources of savings (some savings being fully exempt, while the rest are either fully taxed or receive preferential rates) under existing income taxation, as well as to some anomalous results of the application of the Haig-Simons income concept, e.g., in the case of revaluations of assets due purely to interest rate changes. Kaldor's claim is that the use of actual spending as a criterion removes all the problems of noncomparability of income from various sources – e.g., property vs. work and asset revaluations vs. other sources. He emphasizes the distributional advantages of the expenditure tax which, just as the income tax, can be progressive and can be adjusted to take account of individual circumstances, as well as its incentive effects on savings. In terms of fairness, the reasoning is that since it is by spending that individuals impose a burden on the community, it is on the basis of that spending that they should be taxed. Kaldor also believes, in conflict with current opinion which is concerned with such phenomena as the distortion of labour/leisure choice, that the expenditure tax would be unambiguously superior to the income tax on efficiency grounds.

It is also interesting to note that Kaldor believed the expenditure tax would be more complex to assess and administer than the systems of personal income tax in force in the United Kingdom when he wrote. For this reason he recommended that it should be introduced as a *supplement* to the ordinary income tax, affecting only high-income groups. However, Kaldor also suggested that the practical difficulties of an expenditure tax would be roughly equivalent to those of an ideal UIT (Kaldor, 1955, p. 222). Recent developments in the design of consumption taxes, as discussed below, appear to reduce substantially the complexities of expenditure taxation perceived by Kaldor.

As Prest (1979) pointed out, interest in the expenditure tax seems to resurface about every 20 years or so. There was Fisher in the 1930s, Kaldor in the 1950s, and in the 1970s two major tax reform documents explored the expenditure tax once again. (The lapse in interest subsequent to Kaldor's work partly resulted from disappointing experiences with expenditure taxes in Sri Lanka and India in the 1960s.[8]) These two documents were *Blueprints for Basic Tax Reform* (U.S. Treasury, 1977) – from now on referred to as the "Blueprints" report – and *The Structure and Reform of Direct Taxation* (Meade Committee, 1978) in the United Kingdom. This renewed attention was associated with an increased interest in the efficiency impacts of tax systems that stemmed, on the academic side, from the burgeoning optimal tax literature and, on the policymakers' side, from concerns that the greatly increased scale of taxation might be partly responsible for the lack of growth and the generally poor economic performance experienced in the mid-1970s.

The Blueprints report examined both the UIT and CT options that are investigated in the present study. It concluded that either reform would represent an improvement over the existing situation in the United States on efficiency, equity, and simplicity grounds. However, the report was relatively more enthusiastic about the consumption tax or "cash-flow tax" option. A new method of implementing such a tax, with considerable advantages in terms of equity and simplicity, was advocated in the report. This method, which departs from the *annual* expenditure tax framework, is outlined below in our discussion of taxes on a lifetime wealth or lifetime consumption tax base. Interestingly, the Blueprints report called for the complete repeal of corporate income tax under the consumption tax option.

The Meade committee report has in common with the Blueprints report the recommendation of expenditure taxation. However, the recommended tax essentially takes the conventional annual form, and expenditure taxation is not regarded as a panacea. A cash-flow corporate income tax would be enacted (partly in order to reduce windfall gains that would otherwise accrue to shareholders on tax reform); assets not registered under the expenditure tax would continue to be taxed on an income tax basis; and either a separate progressive tax on cumulative lifetime "accessions" (gifts and inheritances received) or a proportional accessions tax combined with an annual wealth tax would be levied. As suggested by the accessions and wealth tax recommendations, vertical equity considerations had an important impact on the Meade committee report.

Wages

A wage tax is, to an extent, similar to a consumption tax, since by omitting investment income from taxation it also ensures that there is no effect on the relative prices of present and future consumption. For this reason wage taxes are often referred to as "consumption taxes." As is discussed in the next section, while this might appear confusing, there turns out to be good reason for this apparently loose use of terminology. It should be noted that the wage tax treatment can also be applied to receipts in the form of gifts or inheritances. However, while such treatment will not affect the relative prices of consumption in different periods for the recipient of a gift or bequest, it will alter the relative price of one's own consumption and the heir's consumption. By doing so, wage tax treatment of inheritance introduces a type of intertemporal distortion – one which affects the intergenerational consumption choice.

Lifetime Consumption, Lifetime Wealth

It has often been argued that tax burdens should be allocated not on the basis of income or consumption during a single year, but over a longer span. The appeal of such arguments is recognized in most income tax systems by averaging provisions that effectively allow income to be measured over periods of, typically, up to three or five years. A more extreme form of averaging that would result in taxes being assessed on the basis of lifetime wealth or lifetime consumption has, however, sometimes been advocated.

The alternative ways in which a lifetime wealth or lifetime consumption tax base could possibly be implemented, and the advantages of taking such an approach, are discussed in Chapter 3. We need to make a couple of important points, however, that will make the examination of the actual tax system in Canada in the next chapter more meaningful.

A first point to note is that over a lifetime an individual can dispose of his various receipts – gifts and inheritances as well as wages – in just three ways. They may be paid in tax, consumed, or transferred to other persons. Transfers to others may take the form of charitable contributions, gifts, or bequests. Neglecting gifts to charity, and lumping gifts together with bequests, it is often said that after-tax lifetime wealth is exhausted by lifetime consumption plus bequests.

Some advocates of a lifetime consumption tax would suggest that such a tax base should omit bequests from taxation. Others would deem bequests as a form of consumption, which would therefore be subject to tax. There is general agreement, however, that consumption of gifts and inheritances should in principle be taxable, just like consumption of labour income.

It has been recently discovered (see, for example, U.S. Treasury, 1977; Daly, 1981; and Hood, 1982) that, in effect, a combination of annual progressive consumption taxes and wage taxes can provide a tax on lifetime consumption, under certain ideal conditions. The way the two approaches are combined is that taxpayers are given the choice on every investment between true consumption tax treatment and wage tax treatment.[9] If the taxpayer elects the former, he places his investment in a "registered" or "designated" account and takes a tax deduction. His savings accumulate tax-free until they are withdrawn from that account. If bequests are deemed to be consumption, any amounts left in registered form upon death are regarded as having been withdrawn at that point and are taxed.

In addition to having access to registered accounts, the taxpayer would be able to save (or borrow) in non-registered form. The amount saved would not be tax-deductible, but the income earned on investment would not be taxed, and there would be no tax on dissaving in nonregistered form.

The authors of the Blueprints report emphasized that with a choice between registered and nonregistered saving (and borrowing), the taxpayer would be motivated to arrange his affairs so that he was taxed on the basis of lifetime consumption. Registered savings are used to achieve ideal averaging – the taxpayer moves his taxable "income" from period to period to equalize marginal tax rates over a lifetime, thereby minimizing lifetime tax burden. Nonregistered saving or borrowing can then be used to achieve any desired lifetime path for consumption.

The fact that the progressive annual consumption tax and wage tax approaches can be combined to give a tax system that many would view as more attractive than either one on its own is striking and important. It means that a tax system that provides a variety of opportunities for saving in registered and nonregistered forms – like our own – may approximate (for at least some taxpayers) a tax on lifetime consumption. The startling prospect of enacting a tax reform that preserves many of the well-entrenched special features of the current system, and requires merely a rationalization and extension of current provisions preventing the double-taxation of saving, thus emerges from the lifetime consumption tax approach.

The lifetime consumption tax approach, that is, the Blueprints "cash-flow tax" option, has become the dominant consumption tax option under consideration in recent tax reform debate. As our discussion in Chapter 3 will make clear, while this is certainly justified on the grounds of simplicity, there remain those who believe that the annual expenditure tax approach, as advocated, e.g., by Fisher and Kaldor, is superior due to vertical equity considerations. Nonetheless, throughout this study when we refer to "CT" reform we have in mind the Blueprints option, or lifetime consumption tax option. The annual expenditure tax can be regarded as a special case of the Blueprints approach in which the use of nonregistered treatment is very heavily circumscribed.

2 The Current Tax Treatment of Capital Income in Canada

The purpose of this chapter is to outline the current state of capital income taxation in Canada, with particular emphasis on the federal level. Personal and corporate income taxes, resource sector taxes, and property taxes are described in turn. Analysis of the *effects* of these taxes is, for the most part, deferred to later chapters. Thus, for example, the fact that the effective incidence of some taxes whose statutory burden partly or wholly falls on capital (e.g., CIT or property taxes) may actually fall to an extent on consumers, other factors of production, or even foreigners is mentioned simply in passing. Likewise, discussion of the efficiency and equity implications of the tax structure is left to later chapters, except where these implications are immediately apparent – as, for example, in the case of the non-neutralities of the CIT or taxes on pure economic rent (particularly important in resource taxation).

Personal Income Tax

As shown in Table 2-1, personal income tax (PIT) as of 1981 was the most important source of revenue at both federal and provincial levels in Canada. (This was also true at the federal level a decade ago. For the provinces PIT moved from second position, behind sales and excise taxes, in 1969 to first position in 1981.) We cannot say how much of that revenue resulted from taxation of the capital component of personal income.[1] In 1981 about 13 per cent of taxpayers' gross income was composed of capital income, so that one might reasonably assume that PIT must involve a substantial tax on the latter.[2] However, the Canadian PIT is far from being an ideal tax on Haig-Simons income. Its departure from that ideal is particularly striking in its treatment of personal investment and business incomes. Major forms of capital income are excluded from the tax base and others are seriously mismeasured. It has been argued that the resulting system is actually closer to a consumption tax than to a true income tax for the great majority of taxpayers.[3] As discussed below, the 1984 and 1985 federal budgets appear to have moved us even further in that direction.

Personal Investment Income

Exclusions

Haig-Simons income is defined as the maximum that could be consumed without reducing wealth. Exclusions of capital income from the tax base are therefore viewed as undesirable by advocates of a tax on Haig-Simons income. Each exclusion creates what was described in the Blueprints report as a "tax-prepaid" asset. And since the use of such tax-prepaid or "nonregistered" assets, in combination with registered assets [registered retirement savings plan (RRSPs), registered pension plans (RPPs), etc.], may allow the taxpayer to achieve taxation according to lifetime consumption, such exclusions are compatible with a CT approach to taxation.

Perhaps the major form of capital income excluded from tax in Canada is the value of imputed rent on owner-occupied housing. Imputed rent is part of Haig-Simons income. If the taxpayer so chose he could rent out his home (and other consumer durables) and use the proceeds to increase consumption. The rent that could currently be earned on the home, net of all capital and operating costs (mortgage interest and costs of repair and maintenance), should therefore be included in income, according to the Haig-Simons concept.

It is interesting to note that the treatment of imputed rent in personal income tax in Canada, while deficient from a Haig-Simons perspective, is superior to that in the United States (and in many other countries) both from the Haig-Simons and the consumption tax point of view. In the United States, and many other countries, imputed rent is also not taxed but, in addition, mortgage interest is tax-deductible. Such tax systems provide a net *subsidy* to, rather than a tax on, investment in owner-occupied housing.

The fact that in Canada owner-occupied housing is treated as should be a nonregistered asset under the Blueprints scheme moves the Canadian personal income tax significantly towards a consumption tax. Investments in housing make up a large part of the net worth of a majority of taxpayers. According to a careful assessment of the household balance sheet in Canada in 1970, home equity composed about 30 per cent of the net worth of Canadian families (Davies, 1979, p. 242).

Another exclusion from the PIT base is the $1,000 deduction for interest and dividends. First introduced in 1974 as a $1,000 deduction for interest income, it was extended to cover dividends of Canadian corporations in 1975 and taxable capital gains on Canadian securities in

Table 2-1

Composition of Government Revenues by Level of Government, Canada, 1969 and 1981

	Federal level				Provincial level				Local level			
			Percentage of revenue[1]				Percentage of revenue[1]				Percentage of revenue[1]	
	1969	1981	1969	1981	1969	1981	1969	1981	1969	1981	1969	1981
	($ millions)		(Per cent)		($ millions)		(Per cent)		($ millions)		(Per cent)	
Personal income tax	5,415	22,976	39.6	37.9	2,049	16,256	25.9	36.7				
Succession duties	104	1	0.8	–	137	55	1.7	0.1				
Social security taxes	1,722	9,246	12.6	15.2	628	3,868	7.9	8.7				
Corporate income tax	2,402	8,554	17.5	14.1	751	3,372	9.5	7.6				
Property tax					44	149	0.6	0.3	3,055	10,250	88.3	82.4
Sales and excise taxes	4,007	6,965	29.3	11.5	2,270[2]	10,149[2]	35.1	22.9	5	12	0.1	–
Oil and gas taxes	6	7,762[3]	–	12.8								
Other resource taxes					484[4]	6,321[4]	6.1	14.3			11.5	17.5
Miscellaneous taxes	21	5,157	0.2	8.5	1,038	4,186	13.1	9.4	402	2,180		
Total	13,677	60,661			7,901	44,356			3,462	12,442		
					(Per cent)							
As a percentage of receipts by level of government	90.4	87.9			56.6	57.9			55.7	47.4		
As a percentage of GNP	17.1	15.1			9.6	11.1			4.3	3.1		

1 Tax items as a percentage of total tax collections by level of government.
2 Sales and excise taxes at the provincial level include specific taxes on gasoline, liquor, and tobacco.
3 Oil and gas taxes at the federal level in 1981 include: petroleum and gas revenue tax ($1,031); Canadian ownership charge ($630); petroleum compensation charge ($4,265); natural gas and gas liquids tax ($845); royalties ($16). In the National Accounts, PRGT appears as part of the corporate income tax. Royalties are treated as investment income and other taxes are consolidated with other indirect taxes.
4 Resource taxes consist mainly of royalties received by the provincial governments plus miscellaneous taxes on natural resources including the tax on mining and logging profits.
SOURCE St-Hilaire and Whalley (1985), p. 199.

1977. Capital gains were excluded from this deduction in the May 1985 budget.

While the investment income deduction, as of 1977, was likely sufficient to completely exclude interest, dividends, and capital gains from tax for most taxpayers, its impact has since been considerably eroded by inflation. First, by 1985 the real value of the deduction had fallen to $432 in 1974 dollars. Second, high rates of inflation since 1974 have meant that much of the deduction was used up by that component of investment income required merely to hold the real value of assets constant (i.e., the illusory "inflationary" component of nominal investment income). An indication of the changing importance of the deduction is that whereas in the 1975 tax year it eliminated 36.2 per cent of total interest and dividend income from taxation, by 1981 the amount deducted was only 19.1 per cent (despite the fact that at the time, capital gains could also be used to increase the size of the deduction).[4]

A further exclusion from the PIT base is the $1,000 deduction for private pension income. Since pensions are largely the result of saving in the form of registered assets – RPPs and RRSPs – this exclusion is actually too generous even from the point of view of a CT advocate. In fact, for the double-taxation of saving implicit in the Haig-Simons scheme it substitutes zero taxation. That is, the portion of earnings saved in the form of an RPP or RRSP, and exempt under the pension income deduction, is never taxed. This is a major departure from the Haig-Simons approach. The importance of the deduction can be gauged from the fact that, in 1981, it sheltered 21.1 per cent of corresponding pension income from tax.[5]

Finally, one of the most important exclusions of capital income under the PIT system is the cumulative $500,000 lifetime capital gains tax exemption announced in the May 1985 budget. Given the half-taxation of capital gains that was in place prior to the budget, this provision in effect eliminates the tax on $250,000 of taxable capital gains. This exemption was to be phased in over six years beginning with a $20,000 exemption in the first year.[6]

Registered Assets

A long-standing feature of the Canadian PIT system has been sheltered saving for retirement via RPPs and RRSPs. A far-reaching reform of the RPP/RRSP system was proposed in the February 1984 budget and largely confirmed by the May 1985 budget. To set the background for this we will first describe the system as it existed prior to 1984.

In the case of taxpayers who were not members of an RPP, each year contributions up to the lesser of $5,500, or 20 per cent of earnings, could formerly be made to an RRSP. (Part or all of the contribution may actually be to a spouse's RRSP. If the spouse has a lower income, this can result in very large tax savings after the waiting period of two years when it is possible to cash out the spouse's RRSP.) Taxpayers covered by an RPP at work, and their employers, could each contribute up to $3,500 to an RPP. In addition, the taxpayer could contribute to an RRSP as long as the combined (nonemployer) contributions did not exceed the lesser of $3,500, or 20 per cent, of earnings.

The savings in an RPP or RRSP earn tax-exempt income. However, there is not complete freedom in portfolio selection. Until the May 1985 budget, funds could basically be invested only in government or corporate bonds, shares, mortgages, or life insurance policies. Also, at least 90 per cent of the assets in a plan had to be invested in Canada. (Any foreign investments in excess of 10 per cent of the value of the plan were taxed at the punitive rate of 1 per cent per month.)

The alternatives for cashing out an RPP or RRSP are as follows: First, the taxpayer can withdraw all of the funds in a lump sum and include them immediately in taxable income. Second, the taxpayer may purchase an annuity (possibly a joint-survivor annuity with one's spouse) prior to his/her 71st birthday. (The annuity payments would enter taxable income, except that the first $1,000 would be eligible for the pension income deduction.) Third, for taxpayers who desire more flexible payout, it is possible to transfer funds from an RPP or RRSP to a registered retirement income fund (RRIF), where savings continue to accumulate tax-free, but a series of annual payments must be made from the fund, which will exhaust it by the taxpayer's 91st birthday.

One obvious advantage to the taxpayer of saving in RPP/RRSP form is that the relevant marginal tax rates in retirement may be lower than during the peak years of earning power. In this respect the system is acting simply as an averaging device. However, a more important advantage is the tax deferral benefit – the taxpayer's ability to earn income on deferred taxes. There is a large potential tax saving even if the marginal tax rate in retirement is no different from that when the savings are originally made.[7]

The 1984 and 1985 budget proposals, if fully implemented, would dramatically increase the importance of registered pensions as a vehicle to shelter savings.[8] The purpose of these provisions is to provide equal access to sheltered saving for all taxpayers as well as to increase flexibility within the system. As proposed in the 1985 budget, taxpayers would be allowed tax-deductible annual contributions of up to 18 per cent of earnings to a maximum of $7,500 in 1986. This annual dollar ceiling is expected to rise to $15,500 by 1990 and to be indexed to the average wage thereafter. An important associated reform is that *all* employee and employer contributions to both money purchase and defined benefit plans will be aggregated to determine whether the contribution limit has been reached.[9]

The increase in the amount of saving that one could shelter under the new scheme is substantial. It is important to note that the plan is more liberal than the annual contribution limits suggest, since it allows the carry forward of unused contribution limits. Thus the effective constraint moves closer to 18 per cent of *lifetime* rather than annual earnings for most taxpayers (i.e., those for whom 18 per cent of earnings is always below $15,500).

The May 1985 and February 1986 budgets made further modifications to the RPP/RRSP system, which are of note here. The May 1985 budget relaxed considerably the restrictions on the assets that can be held in order to increase the flow of investment funds to small business in Canada. Specifically, this budget would allow registered pension plans to invest at arm's length (up to 50 per cent of assets) in the shares of private Canadian corporations; set up tax-exempt small business investment corporations; expand investment in small business limited partnerships; and add $300 of investment in foreign property for every $100 of qualified investment in small business made in Canada.

The February 1986 budget "freed up" significantly the management of RPP/RRSP withdrawal by retirees. Effective for 1986, maximum limits on annual payouts from RRIFs were removed, taxpayers were permitted to hold more than one RRIF, and the prohibition on the commutation of life or term annuities payable under an RRSP was lifted.

A further measure of the May 1985 budget was to terminate another sheltered saving vehicle, the registered home ownership savings plan (RHOSP). RHOSPs, introduced in 1974, had an annual contribution limit of $1,000 up to a maximum of $10,000. Like RPPs and RRSPs, contributions were deductible and interest accrued tax-free. In addition, if funds were cashed out to purchase a first home, withdrawal was tax-free. Tax-free withdrawal goes further than the CT treatment: it means that the original sheltered income is never taxed. This feature makes the RHOSP, although now defunct, a very interesting tax phenomenon.

"Registered" treatment under the current Canadian PIT is not entirely limited to assets that are formally recognized as registered. Most importantly, the current tax treatment of investment in human capital essentially puts it in the category of a registered asset. The major costs of such investment – tuition fees and forgone earnings – are fully deductible, and other direct costs are implicitly deductible via the $50 per month education deduction. "Withdrawals" over the working lifetime in the form of earnings are fully taxable, just as are withdrawals from RRSPs.[10]

Finally, there have been several recent calls for a registered educational leave savings plan (RELSP). Like the now-abolished RHOSP, the proposed RELSP would have deductible contributions up to some limit, tax-free accumulation of income, and tax-free withdrawal (again up to some limit) in years when the taxpayer left employment to take up full-time studies (Employment and Immigration Canada, 1981 and 1984). Such treatment amounts to further subsidization of education via tax expenditure.

There is not an obvious efficiency-based rationale for RELSPs with tax-free withdrawals. As outlined in Chapter 6, for efficient human capital investment it is sufficient for the taxpayer to have access to a conventional registered savings vehicle like an RRSP, provided contribution limits do not bind. RELSPs, *with* taxation of withdrawals, could be rationalized if the savings required to finance education exceeded those possible via RRSPs.

Tax Treatment of Shareholders' Income

Shareholders derive income in two forms: dividends and capital gains. Each receives special tax treatment.

Dividends from taxable Canadian corporations benefit from the dividend tax credit. This credits the dividend recipient with corporate tax deemed to have been paid on the income that produced the dividend at a rate of 25 per cent.[11] There is frequent overcompensation for corporate tax since due to accelerated depreciation, investment tax credits, etc., many corporations pay little tax, as discussed later on.

Prior to 1972, capital gains were tax-free in both the Canadian personal and corporate income taxes. The Carter Commission proposed that capital gains should become fully taxable. However, the measure implemented allowed one-half of all capital gains to escape tax, which allows some crude integration with CIT. Given the relatively high inflation rates experienced in the 1970s, half-taxation may have been defensible from a Haig-Simons viewpoint; in fact, much of capital gains represented an illusory inflationary gain rather than real income.[12]

Another key point is that capital gains are taxed, more or less unavoidably, on a "realization" rather than an "accrual" basis. That is, capital gains tax applies only when a gain is realized by sale (or deemed to be realized on death or certain other circumstances). In contrast, the ideal procedure under the Haig-Simons approach would be to tax capital gains year by year as they accrue. To tax on a realization basis is to allow a tax deferral advantage.[13]

The indexed security investment plan (ISIP), introduced in the 1983 budget, represented an interesting attempt to tax real capital gains on something closer to an accrual basis. ISIPs were, however, not very popular with investors and were withdrawn in 1985 with the announcement of the $500,000 capital gains tax exemption.[14]

Other Shelters for Investment Income

In recent years, the presence of numerous additional methods of avoiding tax on investment income has been an important feature of the Canadian PIT. Some of the tax shelters have been the result of true loopholes in the tax code, which unintentionally create opportunities for avoidance.[15] Perhaps more important, however, have been the shelters that successive governments have created to provide incentives for investment in particular industries or activities. Major examples over the last decade include the multiple unit residential building (MURB) program, oil and gas drilling funds, Canadian films, and the scientific research and development tax credits (SRTCs).

Over the last 10 or 15 years, PIT shelters have tended to exhibit something of a life cycle. Since they have typically provided very significant tax-saving possibilities, they have tended to become rapidly more popular, and to be exploited in less desirable ways, than their architects had desired or anticipated. This has generally led either to a major tightening-up of the incentive provisions or to the abolition of shelters.

As of 1986 there has been a strong reaction against tax shelters both on the part of the federal government and the public, so that their importance is perhaps less than at any time since the early 1970s. In addition, in the May 1985 budget the federal government announced its intention to introduce a "minimum tax," partly motivated by the desire to prevent any high-income taxpayer from avoiding substantial PIT liability via the use of shelters. (The February 1986 budget confirmed that a minimum tax would be imposed in the 1986 tax year. It had earlier been announced that this would be imposed at a rate of 24 per cent and would principally affect only those with taxable income in excess of $45,000.) Still, it is interesting to examine something of the range and variety of shelters that have been important in recent years, since as discussed in later chapters, these shelters clearly have important efficiency and equity implications. Moreover, it is unlikely that we have entirely rid ourselves of the proclivity to set up the investment incentives that provide the basis for most shelters.

MURBs were introduced in 1974 at a time of rapidly increasing housing prices and rents in order to encourage rental construction. They allowed losses on approved projects to be deducted against other sources of income and "soft costs," which typically formed about 25 per cent of the cost of constructing a building, to be immediately expensed. Concern over revenue losses led to the requirement that soft costs be amortized over the life of a building and to the eventual termination of the shelter. As of 1985 there were still a few MURBs available to taxpayers, but these were restricted to projects started before the end of 1981.

The tax shelter for certified Canadian feature films also dates from 1974. This initially allowed the immediate write-off of the depreciable costs of producing a film with specified levels of Canadian inputs. There has been a slight tightening-up, with a reduction in the depreciation rate to 50 per cent in the year costs are incurred. (The remainder of eligible costs may be written off in the following year.)

Oil and gas drilling funds allow individuals to benefit from some of the substantial investment incentives in the energy sector. Via joint ventures, partnerships, flow-through corporate shares, and so on, a variety of deductions can be obtained including earned depletion, exploration and development expenses, and the federal resource allowance (25 per cent of gross resource profits).

There have long been significant incentives for research and development under the corporate and personal income taxes. Despite the capital nature of much of these expenses, they could be immediately deducted and also qualified for the investment tax credit. These provisions were largely of importance at the corporate level. However, since these incentives did little for innovative small companies, which typically were not in a taxable provision, in 1983 a new mechanism was introduced – the SRTC – designed to approximate a refundable credit. SRTCs rapidly became a major tax shelter not only for corporations, but also for individuals.

The innovative feature of SRTCs was that they could be sold by firms that could not make full use of their R&D tax credits. The purchaser, either a corporation or an individual, could then use the SRTC to reduce tax liability. SRTCs were issued on a large scale. Tax expenditures under the program may have totalled as much as $900 million before June 1984 alone. The May 1985 budget eliminated the SRTC system but provided offsetting improvements in R&D tax credits for firms (including refundable credits for nontaxable small businesses).[16] SRTCs thus had one of the most rapid life cycles of all investment incentives that have been accessible under the PIT system in Canada.

Capital Transfers

Neither gifts nor bequests are included in income for tax purposes in Canada. Since gift and estate taxes are also absent, except in Quebec, Canada may be thought of to a good approximation as a country without formal capital transfer taxes.

As discussed in Davies (1982), the current lack of capital transfer taxes in Canada stems from the provision of deemed realization on death, which was introduced with capital gains taxation in the early 1970s. From the Haig-Simons point of view, this deemed realization represents no more than a "catching-up" for taxes that should, ideally, have been paid when the capital gains accrued. In any case, since the tax falls only on capital gains, considerable elements of property passing on death (e.g., principal residences, investment certificates, consumer durables, and so on) are tax-free, since they do not carry with them capital gains. Finally, the $500,000 lifetime capital gains exemption announced in the May 1985 budget, when fully enacted, would remove any significant threat from this form of death tax for most Canadians.

Business Income

The determination of taxable income from unincorporated business proceeds essentially according to the same rules as under CIT, which are discussed later. The income is of course only subject to PIT, so that it may appear that unincorporated business income is favourably treated relative to shareholders' income. However, in many situations the comparison may actually go the other way. As noted earlier, the dividend tax credit in certain cases produces a reduction in PIT exceeding the tax paid (if any) under CIT. Also, note that the extra burden of CIT is partly compensated for by the fact that retained earnings produce the tax deferral advantage of capital gains tax treatment for the shareholder.[17]

Averaging

From 1972 up until the November 1981 budget the explicit averaging provisions of the PIT had three components: block averaging for farmers and fishermen; general averaging; and forward averaging via income averaging annuity contracts. In the 1981 budget the latter two were replaced by a new scheme of forward averaging.

Under the 1972-81 regime, authors, entertainers, and others with widely fluctuating incomes were allowed to purchase income averaging annuity contracts (IAACs), which spread their income over a number of years for tax purposes. In addition, the taxable portion of capital gains could be rolled over into an IAAC. This treatment is of special interest since an IAAC is effectively a registered asset. That is, the original contribution is deductible, income accrues tax-free within the plan, and withdrawals are taxable. The rigid schedule of required annual withdrawals means that an IAAC was not as attractive as, say, an RRSP, but it still had the essential features of a registered asset.

To deal with fluctuations in income not handled by IAACs, general averaging was automatically provided for all taxpayers. When current net income was more than 20 per cent greater than average income over the previous four tax years (and 10 per cent higher than last year's income), a tax reduction, computed according to a rather complicated formula, was allowed. Note that this scheme would not affect the tax assessment in the case of an income *decrease*.

By 1981 the Department of Finance had become concerned about the considerable revenue leakage due to sophisticated manipulation of IAACs by investors. "Wrap-around" IAACs, for example, had become very popular. On realizing a taxable capital gain an investor would visit a financial institution to purchase an IAAC and borrow funds in such a way that the schedule of interest payments corresponded to the annuity payments from the IAAC. If the borrowed funds were invested the interest would be deductible, so that the realization of the capital gains would have no net tax consequences either in the current year or in the future.

The wrap-around phenomenon increased enormously the flexibility of IAACs as registered assets. An investor who made use of the wrap-around phenomenon to reinvest his capital gain in another asset yielding capital gains could use a wrap-around IAAC to avoid tax on the gains from the new investment, and so on indefinitely, until either gains were consumed or reinvested in an asset yielding returns other than capital gains. Thus, rather than facing a rigid schedule of withdrawals from an effective registered account, as under the conventional IAAC, the investor would be able to time withdrawals with great flexibility.

The system of forward averaging now in force allows income to be carried forward for tax purposes. The top marginal tax rate is paid on such income in the current year and an indexed tax credit is obtained, which can be used at any time in the future when the indexed "accumulated averaging amount" is brought into income. This allows significant averaging while ensuring that no tax deferral advantage is obtained.

Conclusion

As mentioned at the outset of this section, current Canadian PIT is far from the Haig-Simons ideal. In fact, it is much more similar to the CT model. Assets given registered CT treatment include RRSPs, RPPs, and human capital. Nonregistered CT treatment is provided for imputed income from housing and consumer durables, significant portions of interest and dividend income, and substantial amounts of capital gains. Indeed, the Haig-Simons income tax treatment for capital income is the exception rather than the rule. However, it should be noted that subsequent chapters will identify important ways in which the PIT structure diverges from the CT ideal, particularly in its treatment of inheritance and bequest.

Corporate Income Tax

The corporate income tax is highly controversial. Our purpose here is simply to describe current CIT provisions in Canada and some of the recent changes they have undergone. Discussion of different rationales for CIT and reform alternatives is, for the most part, deferred to later chapters.

It is important to note that CIT is both more and less than a tax on capital income. On the one hand, it taxes economic rents earned by corporations, which may represent implicit returns to factors other than capital (e.g., land, natural resources, entrepreneurial ability, monopoly position). On the other hand, it allows the cost of borrowed capital (i.e., interest) to be deducted, so that only the return to equity capital is taxed. Thus CIT is basically a combination of a tax on economic rent plus the return to equity capital.[18] It is important to keep in mind, however, that the current tax base departs significantly from the sum of correctly measured rent and return to equity capital.

The current basis for CIT, that is, taxation of rent and the return to equity capital, makes most sense from the Haig-Simons uniform income tax (UIT) point of view. Correctly measured, rent plus the normal return to equity capital represents the shareholders' Haig-Simons income from a corporation. Thus from the UIT viewpoint, CIT might be rationalized as a withholding tax on shareholders' income. Integration of CIT and PIT, which is partially attempted in Canada, as outlined in the previous section, would be required for ideal implementation of CIT on this basis.

Since the apparent basis of CIT in Canada lies in the Haig-Simons approach to income taxation, in what follows we will essentially be using a Haig-Simons income base as a benchmark to evaluate this tax. (Haig-Simons income in the case of corporations could be defined as the maximum amount that could be withdrawn over a period in dividends without reducing the net worth of a firm.) As pointed out by Bruce (1984), the relevant benchmark would vary depending on the rationale for levying CIT. For instance, one might want to assess how our actual CIT differs from the cash-flow CIT that has been advocated by many CT proponents. However, it seems most natural to focus on how the current system falls short of the Haig-Simons benchmark, since this provides the ostensible basis for our present CIT.

Although CIT produces sizable revenue at both federal and provincial levels, it does not have the pre-eminence of the PIT (see Table 2-1). In 1981, for example, revenues from CIT were surpassed by social security taxes and were not much greater than sales and excise taxes, or oil and gas taxes, at the federal level. At the provincial level, the 8.7 per cent revenue share of CIT was exceeded by the 22.9 and 14.3 per cent shares of sales and excise taxes and resource taxes, respectively.

Not only does CIT account for a fairly small proportion of tax revenue, but its share has been declining. Whereas in 1969, 17.5 per cent of federal revenues and 9.9 per cent of provincial revenues were from CIT, by 1981 these ratios had fallen to 14.1 and 7.6 per cent, respectively. This is largely the result of enriched investment incentives, as detailed below.

Tax Base

The corporate tax base is simply net profit – revenue minus costs – as computed for tax purposes. Calculation of revenue is fairly straightforward. However, it should be noted that only one-half of capital gains are taxable and dividends received from other taxable Canadian corporations are exempt. Computation of costs is more complicated.

While calculation of current expenses is again fairly straightforward (except, for example, in such difficult areas as business entertainment expenses), calculation of capital costs is fraught with difficulties. Many difficulties in calculating capital cost allowances (CCAs), gains and losses on inventories, and deductibility of interest expense are caused by inflation. However, even during periods of stable prices there are serious difficulties involved in the calculation of true economic depreciation.[19]

Capital Cost Allowance and Investment Tax Credits

In general, capital cost allowance in Canada is calculated according to the declining balance method. There are many classes of assets, with depreciation rates varying from 4 to 100 per cent. Prior to 1981 a full deduction was earned for capital expenses occurring in the tax year, but the November 1981 budget reduced the allowance by one-half in the initial year for all assets.

Although declining balance depreciation represents the norm under Canadian CIT, the straight-line method is used in a number of cases of accelerated depreciation. The most important of these is for machinery and equipment used in manufacturing and processing, which is depreciated at a straight-line rate of 50 per cent. (It now takes three years to completely write off assets in this category due to the halving of the CCA in the year assets are acquired under the November 1981 budget.) Accelerated depreciation is also allowed for pollution control and energy conservation equipment (50 per cent rate), investment in films with prescribed amounts of Canadian participation (immediate write-off), and buildings and machinery acquired for new or expanding mines (30 per cent rate).

In addition to depreciation allowances, a broad investment tax credit has been granted in recent years for expenditures on buildings and equipment used in manufacturing and processing,[20] as well as for expenditures on equipment in transportation, construction, and high-cost resource exploration. Until the February 1986 budget, the standard rate was 7 per cent, and higher rates were available in certain areas: 10 per cent in Manitoba, Saskatchewan, the Territories, and northern portions of British Columbia, Alberta, Ontario, and Quebec; 20 per cent in the Atlantic provinces and the Gaspé region; and 50 per cent in selected areas across the country. The tax credit is deducted from the capital cost base in the calculation of CCA.

A further credit is provided for current and capital expenditures on scientific research and development. Prior to the February 1986 budget, the general rate had reached 20 per cent, with a 30 per cent credit in the Atlantic provinces and the Gaspé region, and a 35 per cent rate for small business.

The lack of correspondence between depreciation rates for tax purposes and true economic depreciation, and the subsidy involved in the investment tax credit, represent a considerable departure from the Haig-Simons income concept in the CIT. The magnitude of the departure could be summed up by calculating the difference between the present value (in real terms) of all tax reductions consequent on a $1 investment under the current system compared to the present value of these tax benefits under a scheme of true economic depreciation. Writing off assets that in fact take 20 or 30 years to wear out over three years, and providing investment tax credits in addition, may drive a substantial wedge between these present values. In a period of zero or low inflation, for example, the present value of the tax reductions generated by a $1 investment will considerably exceed the present value of the benefits that would be obtained under true economic depreciation.

A possible justification for the type of investment incentives built up under the Canadian CIT in the 1970s is that they were required to offset the erosion of tax benefits from CCA that otherwise would have occurred due to inflation. (Note that with the reduction in rates of inflation after 1983, this rationale became less applicable, which perhaps helps to explain the reform proposals of the 1985 and 1986 budgets.)

In a period of inflation, historical-cost based depreciation leads to an overstatement of net profit since depreciation is reckoned in acquisition date dollars instead of current dollars. Allowing assets to be written off more quickly than they actually wear out offsets this in two ways. First, the earlier the asset is written off, the higher will be the real value of the CCA. (Inflation will have had less time to reduce the real value of any given nominal amount.) Second, earlier write-off, even with zero inflation, would imply a greater present value of the CCA.

It should be noted that, irrespective of the rate of inflation, allowing a 100 per cent write-off for a depreciable asset in its year of acquisition provides more liberal treatment than is required according to inflation-proofed reckoning.[21] Under the latter, each year a depreciation allowance meant to approximate the real decline in the value of an asset would be allowed. From acquisition date to the time of scrapping, a series of CCA deductions would be allowed that, in real terms, would add up to the initial purchase price of the asset (without discounting).

At low rates of inflation there is little difference between allowing immediate expensing of depreciable assets and allowing 50 per cent rate straight-line depreciation. (That is, the price level will not change enough to seriously erode the real value of the CCA, and discounting is not very important.) Hence, it seems likely that the present value of the stream of tax credits and tax reductions due to CCA now provided, at least for manufacturing and processing, typically exceeds that required under ideal inflation-proof accounting methods.

The results of departing from ideal income measurement via accelerated depreciation and investment tax credits are at least threefold. First, the general burden of CIT is lighter, so that, overall, shareholders' income is more lightly taxed. Second, there are important distortions between different industries and activities. Accelerated depreciation and investment tax credits, which implicitly subsidize the use of capital compared with other inputs, are most advantageous to the most capital-intensive firms. Third, the subsidy to the use of capital encourages a less labour-intensive technique of production. (Governments clearly hope that the latter effect will be dominated on the employment front by the overall expansionary impact of the investment incentives.)

The February 1986 budget proposed important changes in investment tax credit provisions, as a step in the implementation of the plan first broached in the May 1985 budget to reform the CIT by reducing both investment incentives and corporate tax rates. The current provisions for the Atlantic provinces and the Gaspé region, research and development, and high-cost exploration will remain unchanged. However, the 50 per cent special credit for investments in selected areas will be reduced to 40 per cent, and both the general 7 per cent rate and the 10 per cent rate for slow-growth areas will decline to zero by 1989. (Both of the latter credits will be at 3 per cent in 1988, and the standard and slow-growth credits will be at 5 and 7 per cent, respectively, in 1987.) As discussed later, accompanying these changes is a planned reduction in the federal rate of CIT from 36 to 33 per cent, with associated reductions in the special rates for manufacturing and small business.

The considerable reduction in investment tax credits projected in the February 1986 budget would clearly increase the neutrality of the CIT system. If the accompanying change in tax rates makes the package approximately revenue-neutral, then one would expect general approval of these changes among economists, that is, even from those who would advocate a much more radical reform of CIT, for example, putting it on a cash-flow basis.[22]

Inventories

Materials used in current production are costed in Canada according to the first-in, first-out (FIFO) convention. In other words, goods withdrawn from inventory today are costed at the price originally paid for the oldest goods of the same type still in inventory.[23] Since goods withdrawn from inventory must be replaced at current prices, this amounts to taxation of nominal capital gains on inventories. With a stable general price level this would be appropriate (from the point of view of taxing corporate Haig-Simons income). However, during inflation much of the inventory profits thus taxed are purely inflationary.

In recognition of the undesirability of taxing inflationary increases in inventory values, the March 1977 budget introduced a deduction from taxable income of 3 per cent of the value of inventories held at the beginning of a tax year. Clearly, this only provides the correct adjustment if the rate of inflation is 3 per cent. It is therefore not surprising that over the 1970s the effective tax rates on inventory capital under CIT were much higher than on machinery and equipment (Boadway et al., 1984).

The February 1986 budget terminated the inventory allowance. Since the rate of inflation at the time continued to exceed 3 per cent, it is important to note that, unlike the reductions in investment tax credit, this reform actually moves the CIT base *away* from Haig-Simons income measured in real terms. In effect, it reimposes a tax, which had been absent since 1977, on the first 3 percentage points of nominal capital gains on inventories.

Interest Deductibility

Corporate interest payments to Canadian residents are fully deductible under CIT. Deductibility of payments to nonresidents is limited by the "thin capitalization provisions" that are aimed at preventing foreign corporations from avoiding Canadian CIT, and incurring only the 10 per cent withholding tax, by financing their subsidiaries almost exclusively by debt rather than equity

(Boadway and Kitchen, 1984, pp. 130-31). Nominal interest deductibility creates a further error in the measurement of real corporate income during a period of inflation. During inflation a component of interest paid merely compensates the lender for the erosion of the real value of the debt. This component is effectively repayment of principal, and therefore should not be allowed as a cost under Haig-Simons accounting.

While the historical-cost basis of accounting for depreciation and inventories increases corporate tax liability during inflation, interest deductibility is a powerful force working in the opposite direction. The net effect appears to be an increase in true effective tax rates due to inflation, but one which is not as large as sometimes feared (Boadway et al., 1984).

Tax Rates

The standard rate of corporate tax in Canada as of 1986 was 46 per cent. The federal government levied a rate of 36 per cent, leaving 10 percentage points of "tax room" for the provinces. Since the provinces in fact levied varying rates, ranging as high as 16 per cent, the total CIT rate differs across the country. Nevertheless, as is usual, all CIT rates referred to below contain the standard provincial rate of 10 per cent.

Many corporations qualify for CIT rates below the standard 46 per cent. For example, beginning in 1984 Canadian-controlled private corporations (CCPCs) paid tax at the small business rate of 25 per cent on the first $200,000 of income. (Prior to 1984 the small business rate was received on the first $200,000 of income each year up to a cumulative maximum of $1 million.) Also, manufacturing income was taxed at 40 rather than 46 per cent (20 per cent for those corporations qualifying for the small business tax rate).

The February 1986 budget announced a planned decline of the various CIT rates commencing in 1987 and to be fully phased in by 1989. Under this plan, the basic rate would fall from 46 to 43 per cent; the small business rate, from 25 to 23 per cent; the manufacturing rate, from 40 to 36 per cent; and the small manufacturing business rate, from 20 to 18 per cent.

In contrast to the decrease in CIT rates projected in the 1986 budget, temporarily higher CIT rates were actually in force in the mid-1980s due to various surtaxes. A 5 per cent surtax on large corporations was in force from July 1, 1985 until the end of 1986. The February 1986 budget announced that this would be replaced by a 3 per cent surtax on all corporations, effective January 1, 1987.

Resource Sector

Corporations engaged in mining or oil and gas production are taxed under CIT at the standard rate but benefit from various special deductions. This special treatment results in effective tax rates for resource sector corporations being relatively low.[24] Their operations are also subject to a variety of royalties and production taxes that to an extent represent capital income taxation. These other taxes are discussed later on.

Until 1980, when a major package of tax changes for oil and gas was introduced under the National Energy Program (NEP), mining on the one hand, and oil and gas on the other, received quite similar treatment under Canadian CIT. This pre-1980 system has remained essentially intact for mining but was radically altered for oil and gas by the NEP. Despite the fact that the various taxes and special charges levied on oil and gas under the NEP were abolished, or were slated to be phased out under the Conservative government elected in September 1984, the NEP changes in the CIT treatment of oil and gas have remained in force. Thus CIT treatment of mining vs. oil and gas remains divergent despite the dismantling of the NEP.

Mining

There are three forms of special write-offs for capital investment in mining:

1) Accelerated depreciation for capital investment in new or expanding mines, as discussed above.

2) Rapid write-offs for exploration and development: immediate expensing for costs of exploration and development in Canada; and depreciation at a declining balance rate of 30 per cent on the costs of acquiring Canadian mineral resource properties.

3) Earned depletion allowances.

The system of earned depletion allowances is of considerable interest. Although corporations are allowed acquisition costs of mining properties as a depreciable expense (reflecting the fact that, unlike land, for example, mineral deposits are used up in production), depletion allowances reflect a notion that there is an additional cost of exhausting mineral deposits. This notion is only correct in the sense that the true economic depreciation on *any* asset may diverge from CCA. The justification for depletion allowances must therefore be found elsewhere, if at all.[25]

Earned depletion allowances allow a deduction of up to 25 per cent of net income. However, the depletion allowance does have to be "earned." The corporation can only deduct up to one-third of eligible expenditures. The latter include costs of Canadian exploration and development, processing machinery and equipment used in Canadian mining operations, and also setting up townsites associated with new mines.

A final special incentive to the resource sector – which applies to oil and gas as well as mining – is the resource allowance. Corporations and individuals may deduct 25 per cent of their profits from resource operations (gross of exploration, development, earned depletion, and interest deduction). This allowance replaces a deduction for provincial royalties and resource taxes that had been provided prior to 1974. It creates "tax room" for the provinces (which, of course, are generally the owners of the resources) but at the same time puts a ceiling on how much provincial levies can erode the federal CIT base for resource corporations.

Oil and Gas

Some of the provisions affecting the oil and gas industries are very similar to those for mining, although significant differences arose with the introduction of the NEP. Costs of exploration and drilling new oil and gas wells are immediately expensed; the development costs of oil and gas on already-known deposits are depreciable at a 30 per cent declining balance rate; and the costs of acquiring oil and gas leases and wells are written off at a 10 per cent rate. The resource allowance also applies to oil and gas. Finally, in some cases, detailed below, earned depletion is also allowed.

Until 1980 the petroleum industry as well as mining benefited from earned depletion allowances. The architects of the NEP regarded these as less than ideal since they did not provide any immediate assistance to rapidly growing oil and gas firms, which generally reduced their CIT liability to zero for the foreseeable future simply by using the ordinary write-offs for exploration, development, and acquisition. There was also a feeling that small Canadian-owned firms were disproportionately represented among those firms receiving very delayed benefit from earned depletion. A system of direct grants related to exploration and development expenses, the petroleum incentives program (PIP), was therefore introduced under the NEP. This system remained in force as of 1986 despite the dismantling of most other aspects of the NEP.

Under the NEP, earned depletion was phased out completely for exploration and development of conventional oil on provincial lands but was retained for non-conventional and tertiary oil projects (e.g., tar sands plants), crude oil upgraders, as well as exploration in the Canada Lands. (The Canada Lands include the offshore, the Yukon, and the Northwest Territories.) However, as pointed out above, generous PIP grants took the place of earned depletion. The generosity of these grants was differentiated according to Canadian ownership rates and whether exploration was taking place on provincial or Canada Lands. Rates ranged from zero for foreign-owned firms exploring for oil on provincial lands to 80 per cent for Canadian firms exploring in the Canada Lands.

Conclusion

From the above it is clear that Canadian CIT approximates a tax on shareholders' corporate Haig-Simons income very poorly. This is largely the result of a wide variety of incentive provisions – accelerated depreciation, investment tax credits, and special deductions in the resource sector. It is also partly the result of the lack of inflation proofing in the system.

The desirability of moving CIT in the direction of a more uniform tax on Haig-Simons income was recently urged in the discussion paper on CIT released with the May 1985 federal budget. This was also a theme of the U.S. Treasury's (1984) radical blueprint for tax reform – "Treasury I" – released in November 1984. The CIT changes introduced in the February 1986 budget in Canada – the phasing-out of investment tax credits and the phasing-in of lower CIT tax rates – indicate that this direction for reform may actually guide the evolution of CIT in Canada in the near future.

Resource Taxes

The special provisions for the resource sector under corporate income tax have been outlined in the previous section. In addition to CIT, however, the resource industries pay a variety of taxes that are of interest in the context of capital income taxation.

As explained in our introductory chapter, given the scope and purpose of our study we cannot examine the complex field of resource taxation in detail. The purpose here is merely to summarize aspects of resource taxation in Canada that are elements of, or important in the debate over, capital income taxation. Hence, for example, the wide variety of excise taxes levied on minerals and oil and gas receive little attention here. Also, provincial royalties and resource taxes cannot be outlined in detail.

An important role of resource sector taxation is the extraction of a portion of resource rents for the public purse. Although designing taxes to extract rent with the least possible distortion in the pattern or timing of resource exhaustion is a widely accepted objective, there has been considerable debate over the best method of taxing rents. (The possibility that the extraction rate generated by the free market might not correspond with the social optimum makes this problem especially difficult.) It is well known that certain frequently implemented methods of raising revenue from the resource sector may be distortionary. Royalties levied either at a constant per unit or *ad valorem* rate will make some marginal resource projects unprofitable, leading to suboptimal resource extraction, assuming the free-market rate and pattern of extraction were optimal.

An alternative to royalties levied on volume of output or revenue is to tax revenue but allow the deduction of some costs. If all operating and capital costs were deducted the tax would fall, in principle, on pure resource rents. On the other hand, if some capital costs were not deductible, some portion of the normal return to capital would be taxed in addition to rents.

Provincial Taxes

The Canadian provinces, which are the owners of mineral and petroleum deposits in Canada, except for the Canada Lands, levy royalties in the petroleum sector mainly of the *ad valorem* variety. These royalties are generally not simple flat-rate taxes. Rates have in some cases been graduated according to output, and there is usually a lower royalty on "new oil." As of 1985 Alberta, for example, levied a royalty at a rate of 21.7 per cent on old oil on prices up to $6.50 per barrel, and 45 per cent on price increments thereafter. Oil produced from reserves discovered since April 1974, from oilsands projects, and from synthetic oil, however, was subject to a lower incremental royalty (that is, for prices in excess of $6.50 per barrel) of 35 per cent.

Provincial royalties in the petroleum sector thus are formally like excise taxes, rather than taxes on capital income or resource rents, although it has been argued that the lower rates for new oil or more costly sources of supply make royalties approximate profit taxes to some extent.[26] In contrast, the general provincial practice in mining and logging is to levy a tax on profits or net income (that is, in addition to provincial CIT), in some cases with incentives for exploration and development. A number of provinces also levy per unit or *ad valorem* taxes for some minerals. In addition, a few provinces sell licences for exploration and development, while several provinces exact an annual "acreage tax," which is related to the size of the properties exploited by a firm as well as the value of the deposits involved and is an example of an *in situ* tax.

Federal Taxes

The complex provincial involvement in resource taxation sets a background against which federal policy must be designed and evaluated. One possible view is that there is little point in recommending a "first-best" federal resource tax regime since provincial taxes are distortionary,[27] and the problem at the federal level is inevitably "second-best." (See, for example, Cairns, 1985, for an argument along such lines.) A more positive viewpoint would be to note that whatever the provinces are doing, a properly designed federal tax on resource rents could not be distortionary (unless when combined with provincial taxes the effective tax rate on rents exceeded 100 per cent).

Since there is clearly a desire for federal taxation of resource rents, and the design of such taxation is in principle independent of provincial resource taxation, although we can devote very little attention to resource taxation here we can hope to make some useful remarks. It is beyond the scope of this study, however, for us to attempt any analysis of how federal tax policy could be designed to correct or combat perceived distortions in resource exploitation either due to provincial royalties and taxes or other possible market imperfections.

It has been argued, for example by Boadway and Kitchen (1984, pp. 198-200), that one attractive way for the federal government to tax resource rents would be via a cash-flow tax on resource corporations. This could be implemented independently of whether a cash-flow basis were adopted for CIT. Resource firms would simply pay a proportional tax on a base equal to revenue minus all operating, capital, and acquisition costs, without allowance for depreciation, interest expense, or depletion.

Alternative methods of appropriating resource rents for government include using auctions to sell mineral rights to resource firms and taxation of the value of reserves *in situ*. Note that the former approach could only be applied by the federal government for the Canada Lands. The latter approach can only be employed on a one-time basis if it is to be nondistortionary. If an *in situ* tax is levied annually, which is the case with the provincial acreage taxes in mining mentioned above for example, there is an incentive to run down reserves too rapidly (Boadway and Kitchen, 1984, pp. 200-201).

The result of the large increases in the world price of oil in the 1970s was the creation of vast rents from the production of oil and gas in Canada. Helliwell, MacGregor, and Plourde (1983, Table 1, Case 4) estimate that as of 1980 these rents amounted to about US$20 billion on an annual basis, or 8 per cent of Canadian GNP. In the absence of federal action these rents would likely have accrued principally to oil and gas firms and the producing provinces. In fact, the rents were redistributed by federal action on two fronts: price controls, which redistributed rents to consumers, and tax innovations under the NEP.

One component of the NEP has already been outlined in the previous section. The system of earned depletion allowances was replaced by PIP grants, which provided direct subsidies to oil and gas firms based on their exploration and development expenses, degree of Canadian ownership, location, and type of operation. In itself, this measure could be expected to reduce net federal revenues and encourage both Canadian ownership and some exploration and development. Replacing earned depletion by PIP grants was therefore directed towards the objectives of increasing Canadian ownership and self-sufficiency in oil and gas, rather than to rent extraction.

An important element of the NEP was, however, increased rent extraction via an assortment of new taxes. These included the petroleum and gas revenue tax (PGRT), the natural gas and gas liquids tax (NGGLT), the oil export charge, the petroleum compensation charge, and the Canadian ownership special charge. With the exception of PGRT these levies were effectively per unit or *ad valorem* royalties. The petroleum compensation charge was of particular interest since its purpose was to raise funds to pay for oil import subsidies in eastern Canada. The role of this charge in redistributing rents from producing firms and provinces to consumers is therefore particularly clear. Again with the exception of PGRT, these charges were all abolished by the Conservative government elected in September 1984 by the time of its May 1985 budget. The same budget announced that PGRT would be phased out gradually by 1989.

The importance of the NEP levies is illustrated in Table 2-1, which indicates that in 1981 they accounted for $6.8 billion, or 11.2 per cent, of total federal revenues. It might seem, therefore, that removal of these levies would create significant fiscal difficulties for the federal government. The importance of this effect, however, is exaggerated by these raw figures. In fact, $4.9 billion of the total represented the Canadian ownership and petroleum compensation charges – required to fund oil import subsidies and takeover activities, which have now been abandoned.

PGRT is levied on royalties or net revenues (individual or corporate) from oil or gas production in Canada or the processing of Canadian petroleum up to the crude oil stage. Net revenues differ considerably from net income for CIT purposes. In particular there are no deductions for depreciation, exploration and development costs, depletion, inventory and resource allowances, interest payments, research costs, or any royalties or other payments to government on account of oil and gas production. In other words, the PGRT base consists of resource rents plus the gross normal return to capital. Given the high capital intensity of the oil and gas sector, however, it has been argued that PGRT approximates fairly well an *ad valorem* gross royalty (Perry, 1984, p. 102).

PGRT was introduced in 1980 at an initial rate of 8 per cent. Together with the other NEP levies, and associated price controls, it was so effective in extracting resource rents that it has been estimated that average net producer returns in oil and gas became negative (Scarfe, 1984)! This created serious conflict between the federal government and the producing provinces, which was not resolved until September 1981. Under the terms of the September 1981 agreement, PGRT was raised to 12 per cent, NGGLT was removed from exports of natural gas, and oil prices were increased considerably in order to improve returns to producing firms and provinces. Over the period 1981-85 the PGRT rate rose as high as 16 per cent but subsequently declined to a level of 13.33 per cent by 1986 (for conventional oil and gas).

The dismantling of the NEP levies had not been matched as of 1986 by any withdrawal of the generous PIP grants introduced under the NEP. Since the latter generally provide more support for the industry than would earned depletion allowances, the net result of the 1985 changes in federal oil and gas taxation is to create a situation where there is even less attempt to tax resource rents in oil and gas than there was prior to the NEP. In principle, this ought to benefit producing firms and create additional tax room for producing provinces. However, the dismantling of the NEP levies was followed very soon by a collapse of world oil prices in early 1986, bringing the real price down to something like its pre-1973 level. Hence, oil and gas resource rents in Canada, as of the first quarter of 1986, were a small fraction of the 8 per cent of GNP figure for 1980 mentioned above. Thus the federal attempt to tax oil and gas rents terminated at about the same time as the rents! It seems unlikely that there will be a major new initiative to tax rents in this sector until the world price of oil again begins to diverge sharply from Canadian production cost.

Conclusion

There has been little attempt to tax resource rents at all heavily in Canada except for the 1980-84 bout of NEP special taxes and levies. We have now returned to the pre-1980 pattern of providing such strong preferential treatment for the resource sector, at the federal level, that the effective tax rate on profit in this sector is significantly below overall levels. The justification for this approach may have to lie in equity considerations, since a pure tax on resource rents (e.g., a cash-flow tax), if expected to be in place on a permanent basis, need have no effect on the pattern or timing of resource exhaustion. An important equity consideration in this context is the division of "tax room" with respect to resource rents between the federal and provincial governments.

Property Tax

Recently there has been increasing recognition of the importance of real property taxes in the overall taxation of capital and capital income. While part of the tax is levied on land, the property tax base is mostly composed of the value of residential and commercial/industrial structures.

As shown in Table 2-1, over 80 per cent of municipal revenue is from property taxes. At $10.2 billion in 1981, the amount collected exceeded federal CIT revenue ($8.6 billion) and was almost half as great as federal PIT revenue ($23.0 billion). As a fraction of the total tax revenue of all three levels of government, property tax contributed 8.7 per cent.

The residential property tax adds an important footnote to our earlier discussion of the current tendency of PIT to evolve in the direction of a CT system. Recall that for PIT purposes, as a nonregistered asset, housing receives CT treatment. To some extent the property tax "makes up" for the PIT exemption of imputed rental income, so that the combined PIT and property tax systems approximate somewhat better a true income tax than does PIT on its own.

Despite the enormous variation in property tax rates across (and often within) cities and regions, since the tax is nongraduated it may be useful, if somewhat crude, to think of it as approximating a "flat tax" on the *value* of taxpayers' homes. Such a tax is roughly equivalent to a flat tax on *gross* imputed rental income. (A tax on homeowners' equity would be required to produce a result similar to a tax on net imputed rental income.) In view of the nature of the base and the absence of consideration of taxpayers' other characteristics in computing the tax, it is thus likely that the pattern of property tax payments differs considerably from the tax increments that would be observed if net imputed rental income were taxed under PIT.

Since age is a prime determinant of the proportion of home value that represents equity, it is interesting to note that property tax assessments as a fraction of net imputed rental income must generally be highest for the young. To the extent that property taxes are not shifted, this has equity implications that would generally be considered undesirable. The possibility for distortion in saving patterns of younger households is also clear, especially in view of the considerable scope for tax-sheltered saving available to the young. These issues will be examined more carefully in later chapters.

It is also of some interest that the implicit tax rate on net imputed rental income generated by the property tax may well on average *decline* with income. In the 1982 family expenditure survey, for example, the overall ratio of equity to reported market value of the home was 0.79. For the bottom five income deciles of families this ratio varied from 0.79 to 0.98, while for the top five deciles it was in the range of 0.73 to 0.79.[28] If the property tax was a constant fraction of gross imputed rent, this would imply a generally declining tax as a fraction of net imputed rent as income rises.[29]

There have not been any Canadian studies of which we are aware that would indicate the implicit tax rate on the return to commercial and industrial structures generated by the property tax. However, this issue has been studied in the United States by Fullerton and Henderson (1984), who find that property tax is a very important component of the overall taxation of capital income. Their results indicate, for example, that with the 1982 law the elimination of property taxes in the United States would reduce the overall effective tax rate on capital income from 26.4 to 8.7 per cent. The impact in the corporate sector would be a decline from 30.0 to 9.7 per cent, while in the noncorporate sector the effective tax rate would drop from 32.7 to 19.2 per cent (Fullerton and Henderson, 1984, Table 5).

The fact that property taxes are of similar (and sometimes greater) importance to PIT and CIT in the statutory taxation of capital income has important efficiency implications, which are brought out in subsequent chapters. Like CIT, it can be argued that property tax levies an implicit partial tax on capital income. But while CIT may perhaps be thought of (following Harberger) as a sector-specific capital income tax, the property tax is asset-specific (that is, it only applies to land and structures). Thus, while CIT encourages a shift of capital from the corporate to the noncorporate sector, property taxes will operate in both sectors to encourage less use of land and structures and more use of other factors of production, including other forms of capital. Note that the latter bias reinforces the effect under CIT of allowing accelerated depreciation for machinery and equipment used in manufacturing and processing, but not for structures.

Summary

This chapter has surveyed the current state of capital income taxation in Canada. The object has been to outline the statutory structure, rather than to discriminate between taxes that are actually borne by capital and those that may be shifted to other factors of production, consumers, or foreigners. Discussion of the efficiency and equity implications of the structure has, for the most part, been deferred to the remainder of the study.

We have seen that despite the influence that the Carter Commission "dollar is a dollar" philosophy has had on our attitude towards PIT in this country, the current Canadian PIT diverges sharply from the strict Haig-Simons or UIT approach. Quantitatively, a larger portion of assets probably receive either registered or non-registered ("tax-prepaid") CT treatment than UIT treatment. This situation appears to be a reflection of a trend in the direction of a consumption tax design for personal income tax, which has been continuing for at least the last decade. Certain measures, such as the termination of income averaging annuity contracts in 1981 and the introduction of a minimum tax in 1986, tend in the opposite direction, but their impact appears weaker than that of the liberalization of registered savings plans slated to take place in the late 1980s and the $500,000 lifetime capital gains exemption announced in 1985.

In part, the movement towards a CT approach under PIT has been echoed in the evolution of Canadian CIT. Accelerated depreciation, investment tax credits, and other incentives have become so generous that despite the relatively high statutory rate of tax, collections have been falling in relation to total government revenue. However, at the same time that the $500,000 lifetime capital gains exemption was introduced (in the May 1985 federal budget), a discussion paper suggesting that CIT be reformed essentially to put it on a Haig-Simons income base was released. Seemingly inconsistent with the recent evolution of PIT, this approach may not be in serious conflict with the consumption tax tack, since the intended reform of CIT would be revenue-neutral. The real impact of the reform, which the February 1986 budget began to implement with projected reductions in investment tax credits and tax rates, may be to eliminate distortions in the allocation of capital induced by the current CIT, rather than to increase reliance on income, as opposed to consumption, taxation.

We have also seen that, historically, there has been little attempt to appropriate economic rents from the resource sector at the federal level, although provincial governments, vested with the ownership of natural resources, have long levied a battery of royalties and resource taxes for this purpose. An exception to this rule was the NEP, which succeeded in redistributing substantial rents from producing firms and provinces towards the federal government and consumers. With the dismantling of the NEP in 1984-85, and the collapse of world oil prices in 1986, we have moved to low effective federal taxation of (less extreme) profits in the resource sector.

Finally, we have briefly noted the sizable importance of real property taxes in Canada. These offset to a substantial degree the exemption of imputed rental income from PIT, nudging us away from the consumption tax end of the spectrum. They also increase capital taxation for business by implicitly taxing the return to capital invested in commercial and industrial structures, a form of partial capital income taxation that encourages the use of less structure-intensive methods of production.

3 Defining and Implementing Major Reform Options

In our first chapter we discussed briefly the conflict between advocates of income vs. consumption as an ideal tax base. In this chapter we will outline the relationship between alternative tax reform options more rigorously and discuss how they could actually be implemented in Canada. The first section defines the options by spelling out the algebra of saving and taxation over a lifetime and indicating the relationships between alternative possible tax bases. We also examine the motivation in terms of equity considerations (and some obvious efficiency considerations) for the choices between these bases made by different tax reform advocates. The following two sections examine the implementability of alternative types of consumption tax and uniform income tax reforms in Canada.

Defining the Options

As pointed out in the first chapter, there have long been advocates of two apparently simple tax bases defined in terms of annual flows: Haig-Simons income and consumption. On the other hand, it has also long been argued that it may be desirable to take a much longer time period as the frame of reference for assessing tax burdens. However, only recently has it been suggested that there are practicable methods of taxing *lifetime* income or consumption.[1] Such methods have considerable subtleties. Fortunately for exposition, in the simple proportional case, taxes levied on annual flows are equivalent to those on corresponding lifetime flows, so that it is possible to start off the discussion by avoiding the subtleties that arise when progressive taxes are considered.

Proportional Taxes

In each year t, in a somewhat stylized accounting, an individual may obtain receipts of earned income, E_t, capital transfers from others (inheritances), I_t, or government transfer payments, G_t. These basic receipts, added up and appropriately discounted over a lifetime, form an individual's "lifetime income" or (more properly) "lifetime wealth," L:

$$L = \sum_{t=0}^{N} \frac{E_t + I_t + G_t}{(1 + r)^t}, \qquad (3.1)$$

where r is the rate of interest and N is the last period of life. Writing lifetime earnings, inheritances, and transfer payments as E, I, and G, respectively, we have alternatively:

$$L = E + I + G. \qquad (3.2)$$

Lifetime wealth may be expended in three ways: in consumption, C; on bequests, B; or on tax payments, T. We therefore have the lifetime budget constraint:[2]

$$\sum_{t=0}^{N} \frac{C_t + B_t + T_t}{(1 + r)^t} = \sum_{t=0}^{N} \frac{E_t + I_t + G_t}{(1 + r)^t}, \qquad (3.3)$$

or,

$$C + B + T = E + I + G.$$

If earnings, inheritances, and transfers were exogenous, lifetime wealth, L, would uniquely determine the taxpayer's lifetime consumption opportunities. For this reason it has been considered by many an ideal measure of the ability to pay.[3] It is therefore interesting to consider the properties of taxes levied on a lifetime wealth tax base.

It is clear from equation 3.3 that a proportional tax can be levied on lifetime wealth by two different means: via a proportional tax either on consumption and bequests or on earnings, inheritances, and government transfer payments. Both tax schemes are referred to in the literature as "consumption taxes." This is appropriate if it is felt that bequests should simply be regarded as a form of consumption.

Not all CT advocates believe that bequests should be treated as equivalent to consumption. If one believes, strictly, that families ought to be taxed on what they "take out" of the economy, rather than according to what they "put in," taxing bequests is unattractive. Assets bequeathed to heirs do not escape tax: tax will be paid as the heirs consume the income from these assets (or perhaps the assets themselves). In addition, taxing bequests *may* be undesirable from the viewpoint of efficiency. If the reason that people make bequests is partly that they derive satisfaction from the net increase in resources that will be made possible for their heirs, a tax-induced change in the price of this "commodity" will be distortionary in just the same way as a change in any other commodity price caused by taxes. A consumption tax that does not apply to bequests will be referred to below as an expenditure tax (ET).

Under ET the convenient equivalence with a tax on $E + I + G$ no longer holds. The expenditure tax is not equivalent to a "wage tax."[4] The equivalence cannot be restored by omitting inheritances from the wage tax base, since in general $B \neq I$.

The nonequivalence of strict wage and expenditure tax bases is interesting in view of the widespread labeling of the two as consumption taxes. Aside from the fact that they provide the same lifetime tax base in a pure life-cycle world with proportional taxes, all wage and expenditure taxes have in common is that, when proportional, neither imposes any intertemporal distortion.[5]

So far we have not mentioned the concept of annual income or the possibility of levying a tax on that base. Under the standard Haig-Simons definition, income equals the maximum that could be consumed in a period without diminishing initial wealth. As conventionally interpreted, this means that annual income differs from L_t by the extent of any investment income. Assuming a uniform rate of return on all investments, r, investment income, M_t, is related to wealth at the start of a period, W_t, as follows:

$$M_t = rW_t. \tag{3.4}$$

And annual income, Y_t, is given by:

$$Y_t = \begin{cases} E_t + I_t + G_t + M_t, \\ L_t + M_t, \end{cases} \tag{3.5}$$

where L_t is noninvestment income.[6]

An alternative definition of income, which underlies some tax reform ideas, would net out bequests with inheritances:

$$Y_t' = E_t + G_t + M_t + (I_t - B_t). \tag{3.6}$$

If such a definition was actually applied, while inheritances would be taxed, bequests would be deductible. While bequests certainly reduce the amount available for consumption and inheritances increase it, it is not clear that they should be deducted in calculating Y_t according to the Haig-Simons approach. According to the Haig-Simons definition, income is the maximum that could be consumed without reducing wealth. Bequests are voluntary. The individual *could* decide to set $B_t = 0$, so that it might be argued that amounts bequeathed are inescapably part of Haig-Simons income.

A further possible variant would be to define income on the basis of what labour economists refer to as "potential" rather than "actual" earnings.[7] Potential earnings, E_t^P, equal the maximum amount that could be earned if gross human capital formation were reduced to zero (without increasing the total hours devoted to schooling plus work). The motivation for setting up the income definition on this basis is clear. If the Haig-Simons definition is taken seriously, then E_t^P should be used instead of E_t since the worker has the choice of increasing consumption by reducing human capital investment (and Haig-Simons "income" is the maximum that can be consumed holding wealth, which may be defined to include human capital, constant). The use of E_t^P rather than E_t may even be viewed as the *ideal* Haig-Simons procedure. However, in the main exposition we will stick to the definition in equation 3.5 since it is conventional.

Annual income may be expended on consumption, taxes, saving, S_t, and bequests:

$$Y_t = C_t + T_t + S_t + B_t. \tag{3.7}$$

From equations 3.5 and 3.7, note that as long as investment income and saving are positive, annual income (i.e., Y_t) will exceed both noninvestment income, L_t, and consumption. Hence, in order to achieve the same revenue yield, a tax on income does not have to be levied at as high a rate as one on noninvestment income or consumption.

It is also useful to note from equation 3.7 that an expenditure tax can be implemented by computing $Y_t - S_t$, rather than by trying to calculate the amount consumed directly. While this is unimportant in the context of proportional taxation – the desired expenditure tax can be obtained by means of a uniform proportional sales tax or a value-added tax (possibly combined with death duties at the same rate if bequests are to be taxed) – if a progressive tax is desired, the only practicable method of obtaining an expenditure tax is to measure consumption as a residual after savings are deducted from income.

Progressive Annual Income Tax

Consider first the characteristics of a progressive tax levied on annual income, Y_t or Y_t'. If one really believes that Haig-Simons income on an annual basis is the correct indicator of the ability to pay and desires progressivity, then a progressive tax on Y_t or Y_t' would be ideal. However, it must be pointed out that few observers *really* appear to consider this approach ideal (quite apart from any difficulties of implementation).

As is well known, annual incomes fluctuate. Some taxpayers (farmers, fishermen, entertainers, investors) experience much more fluctuation than others. This raises a problem which is believed to create "horizontal inequity" even by those whose stated belief is that annual Haig-Simons income is the best measure of the ability to pay! To see the nature of the problem, consider the taxes paid by two persons, A and B, over two years in a world with a zero interest rate and a progressive annual income tax. A earns $20,000 in both years and B, $40,000 in the first year but nothing in the second. If the marginal tax rate is zero on income up to $10,000 and 50 per cent thereafter, A pays tax of $5,000 in both years for a total of $10,000, while B pays $15,000, all in the first year. This considerable difference in total tax burdens arises despite the fact that A and B have the same earnings over the two years. The disparity would widely be considered inequitable.

The fact that the difference in tax burdens for A and B in the example would almost universally be condemned is an indication that whatever the appeal of the Haig-Simons income concept, most people feel that a single year is too short an accounting period for equitable tax assessment. This raises the question of whether there is some income concept for a longer period of time that corresponds better with people's intuitive notions of an equitable tax base.

A typical response to the problem of fluctuating incomes among UIT advocates is endorsement of at least short-term averaging and, sometimes also, longer-term forward averaging (Goode, 1980). In contrast, the CT advocates' response is typically that, for equity, it is the taxpayer's lifetime ability to pay and the lifetime tax burden that are of concern. We, therefore, should scrap the annual Haig-Simons approach entirely and, perhaps, aim to tax the lifetime budget constraint.

The real disagreement between UIT and CT advocates may not be over whether annual or lifetime resources provide the best reflection of the ability to pay, but whether a short-term moving average of annual income is a better indicator of the ability to pay than some proxy for lifetime income. While the UIT advocate may believe that a three- or five-year moving average is superior to a single year's income as a tax base, he/she does not appear to believe that trying to tax lifetime wealth would be better than using the short-term moving average. This view may be founded on a belief that whereas the short-term moving average has readily apparent and desirable effects, we do not really know how to tax on a "lifetime" basis (especially taking into account problems of imperfect capital market and changing household composition). In addition, it may owe something to the observation that the scale and nature of government activities change considerably over time. It may be considered appropriate for those who have more sizable *current* incomes to pay for *current* government expenditures.

It seems possible to argue, however, that even these reasons for preferring a short-term to a lifetime view are implicitly founded on lifetime notions of equity. For example, the belief that a short-term moving average makes a better tax base than lifetime wealth, because an attempt to tax the latter may not be implementable, could be interpreted as rejecting an explicit attempt at lifetime taxation on the grounds that a less ambitious approach will *actually* allocate tax burdens more in accordance with permanent (i.e., lifetime) income. Similarly, the argument for trying to tie current taxes to current government expenditure may reflect a worry that, say, if some of those with low current income are heavily taxed because their lifetime incomes are expected to be higher, they may be deprived of services for which they have effectively prepaid by future cutbacks in government expenditure. But this reflects a concern with *lifetime* equity – failing to relate taxes to the current normal level of income is perceived as an error because it will lead to differences in tax burdens *over the lifetime* for people with equal lifetime resources and equal lifetime benefits from government expenditure.

There is further evidence that UIT and CT advocates may share similar fundamental concepts of equity, differing simply in their beliefs about the best way to achieve these. This concerns the treatment of intergenerational transfers. Whether or not it is believed that bequests should be deducted from income, the strict Haig-Simons approach clearly calls for inheritances to be included in taxable income. While this approach has been seriously urged by Haig-Simons advocates (e.g., the Carter Commission), in practice inheritances are never taxed in this way. The problem is that inheritances are typically received at only a few points in a lifetime, and in the years when they are received they often eclipse any other form of income. Taxing on an annual basis or with a short-term moving average would therefore often result in the taxpayer vaulting into the top marginal tax bracket. If his/her usual income is low or moderate, this is generally viewed as inappropriate. The solution that has been adopted, with the notable exception of Canada in recent years, has been to tax inheritances separately under an estate and gift tax system.

If the above interpretation is correct, the reason we do not find inheritances taxed under PIT is that people take a much longer view of the period over which income should be assessed in allocating tax burdens than UIT advocates have recognized. That it has not been considered adequate to bring inheritances into taxable income and deal with the upsurge of income by ordinary averaging methods may indicate that it is a *lifetime* view that people fundamentally regard as appropriate.

Finally, it should be noted that if it could be agreed that tax equity should be assessed in a lifetime context, in principle there would be little disagreement over the ideal tax base. This is because for the lifetime as a whole the Haig-Simons concept of income and lifetime wealth correspond (Goode, 1980, p. 53). That is, the maximum an individual can consume over his/her lifetime as a whole, in present value, is just L, or $L - B$ if we think of bequests as unavailable for consumption. Thus the same problem of deciding whether to deduct bequests as arose in the annual Haig-Simons discussion recurs in the lifetime context, but this is not associated with any difference between the Haig-Simons and consumption tax viewpoints over the ideal tax base.

Progressive Annual Expenditure Tax

While it is easy enough, under a proportional regime, to obtain a tax on lifetime consumption by taxing annual flows, with progressive taxes this is no longer the case.

For simplicity, in the following discussion we assume that both inheritances and bequests are zero and there are no government transfer payments. Then one might naively attempt to tax lifetime wealth by levying a progressive tax on annual consumption expenditure or earnings. This will only work[8] if consumption or earnings are constant over every taxpayer's lifetime, or if the time path of consumption or earnings has the same shape (proportionally) for every taxpayer. Since these are very special conditions, in practice a progressive tax on annual consumption or earnings will not yield a straightforward progressive tax on lifetime wealth.

The nature of the problem is illustrated in the same example considered in the previous subsection. Let A and B each live for two periods in a world with zero interest rate and a progressive tax on earnings. A earns $20,000 in both periods, while B earns $40,000 in the first period but nothing in the second. Once more, there is a zero marginal tax rate on earnings up to $10,000 and a 50 per cent rate thereafter. A pays tax of $5,000 in both periods for a lifetime total of $10,000 while B pays $15,000, all in the first period. Thus taxpayers with the same lifetime earnings are not bearing the same lifetime taxes.

The departure from a lifetime wealth tax base occurring under progressive taxation of annual earnings or consumption expenditure will be greater the larger the variation between taxpayers in time paths of earnings or consumption. The problem might be less severe in the case of an expenditure tax than an earnings tax because the time path of consumption is smoother than that of earnings. While the simple life-cycle model in which consumption is constant over the lifetime is unrealistic, it is true that consumption is more stable than earnings. However, there are sufficiently large changes in consumption, both from year to year (perhaps due to capital market problems) and over the lifetime (perhaps related to systematic changes in the efficient technology of home production) that consumption is far from constant. A progressive annual expenditure tax does not give us a progressive lifetime wealth tax.

There is an additional difficulty with a progressive annual expenditure tax. (This difficulty does not afflict a progressive annual earnings tax.) This is that it does not provide the intertemporal neutrality of a proportional annual expenditure tax. We will illustrate this by example.

Consider an individual who has earnings of $25,000 in the first period of his/her lifetime (the working years), but who will earn nothing in the second period. This individual would like to consume twice as much in retirement as in his/her working years, given a before-tax interest rate of 100 per cent and a particular progressive annual expenditure tax. The latter levies a zero rate on consumption up to $10,000 and a rate of 50 per cent thereafter (on a tax exclusive basis). Then the individual ends up allocating $10,000 of earnings to first period consumption and saving $15,000 for the second period. After-tax consumption is $10,000 in the first period and $20,000 in the second, giving the desired 2 to 1 ratio.

Note that in the example set up, if the consumer were to save an additional $1, the rate of return would be much less than the pre-tax return of 100 per cent. One dollar less of consumption in the first period will not affect taxes (which are zero) in that period. However, additional dollars transferred to the second period are effectively taxed at 33-1/3 per cent. After saving an additional $1, and receiving another $1 in interest, the individual will only be able to consume an extra $1.33 in the second period. (A 50 per cent tax on this amount equals 66-2/3¢, exhausting the $2 made available by saving and interest.) Hence the after-tax rate of return is 33-1/3 per cent rather than 100 per cent.

More formally, it is easy to show that the rate at which second-period consumption can be increased by reducing first-period consumption is given by:

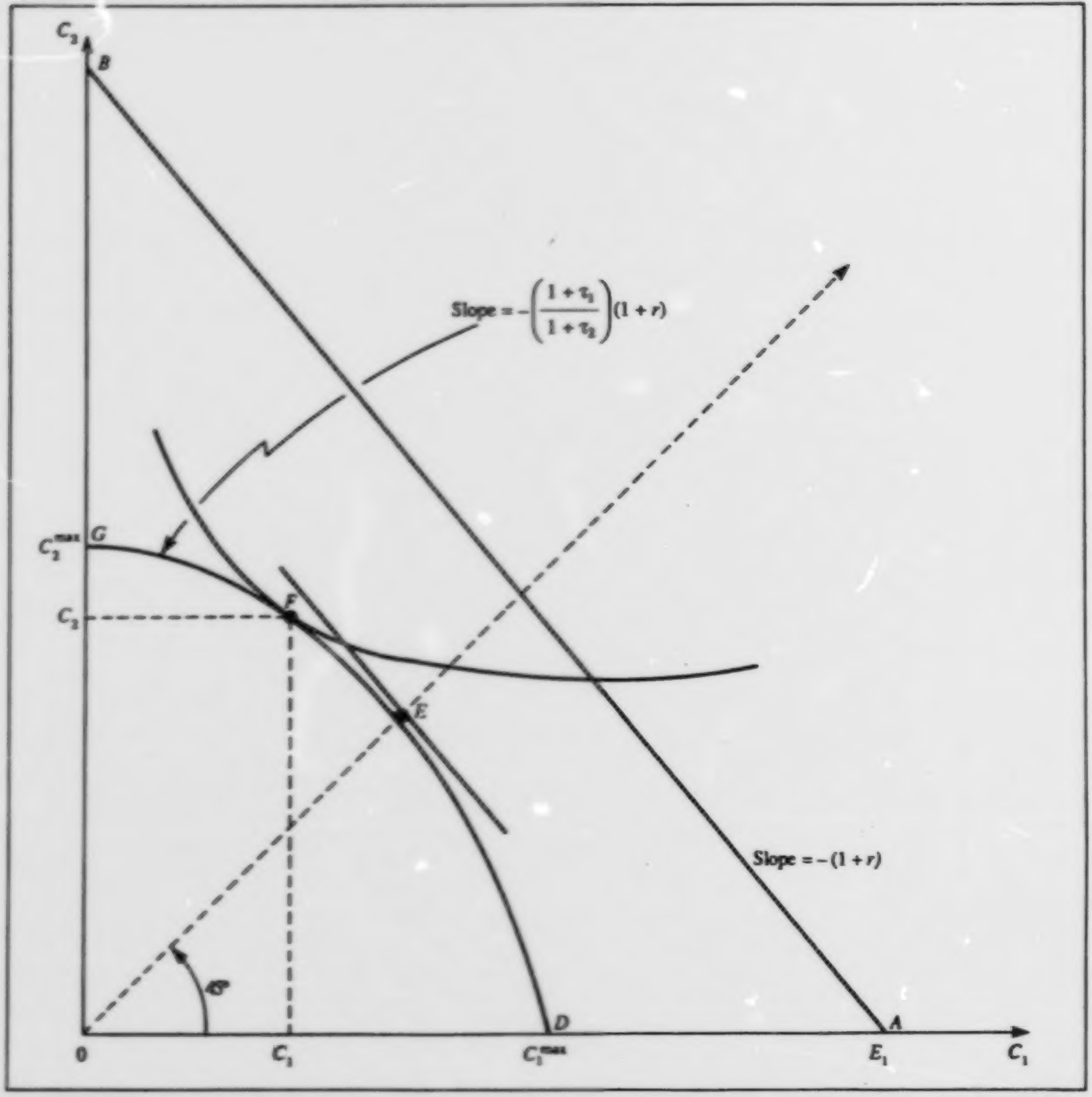
$$\frac{\partial C_2}{\partial C_1} = -\frac{(1+\tau_1)}{(1+\tau_2)}(1+r), \tag{3.8}$$

where τ_t is the marginal rate on consumption in period t.[9] This relationship defines the slope of the two-period budget constraint, which is illustrated in Figure 3-1, for the case of marginal tax rates rising smoothly with consumption.

Figure 3-1 shows the "endowment" of the taxpayer at point *A* – earnings of E_1 in the first period and nothing in the second period. In the absence of taxation the budget

Figure 3-1

Budget Constraint under a Progressive Annual Expenditure Tax



constraint would be the straight line *AB* with slope $-(1 + r)$ determined by the interest rate, r. With the progressive annual expenditure tax the budget constraint becomes the concave line *DEFG* if the marginal tax rate rises smoothly with the level of consumption.

One can see, as follows, that the line *DEFG* must have the indicated shape. If nothing is saved for the second period, maximum first-period consumption, $C_1^{\max}$, occurs. If instead the consumer saves a small amount, the rate of increase of C_1 will be quite high. This is because with a system of rising marginal tax rates, τ_2 will initially be zero, whereas τ_1 will be high, so that

$$\frac{\partial C_2}{\partial C_1} = -\frac{(1 + \tau_1)}{(1 + \tau_2)} (1 + r)$$

will initially be large in absolute value. As more is saved, consumption in the first period continues to decline and that in the second period to increase so that τ_2 rises while τ_1 declines. Thus the budget constraint steadily becomes less steep.

With utility defined on consumption in the two periods of life, we have a set of indifference curves in C_1,C_2 space, and the consumer optimizes by choosing to consume at point *F*, which is on the highest indifference curve intersecting the budget constraint. At this point the marginal rate of time preference is equal to the after-tax rate of return.

There is one special case in which the progressive annual expenditure tax would not put a wedge between before- and after-tax rates of return. That is where an indifference curve is tangent to the concave budget constraint on the 45° line. On the 45° line consumption is equal in the two periods and, given the same tax structure in the two periods, $\tau_1 = \tau_2$. Thus, from equation 3.8, the slope of the budget constraint is $-(1 + r)$ – the same as the slope of the no-tax budget constraint.[10]

As mentioned above, although a progressive annual expenditure tax would in general distort intertemporal choice, this is not true of a progressive annual earnings tax. Even with a rising marginal rate such a tax would produce a budget constraint emanating from a point like *D* in Figure 3-1, with a slope of $-(1 + r)$. In other words, irrespective of the extent of saving, the taxpayer would have to pay an amount like *DA* in tax in the first period. A dollar saved would allow an extra $\$(1 + r)$ of consumption in the second period, due to the absence of any tax on the interest r.

Progressive Lifetime Consumption Tax

As mentioned in Chapter 1, the authors of *Blueprints for Basic Tax Reform* (U.S. Treasury, 1977) made an important observation about consumption tax design. This was that by combining features of annual progressive wage and expenditure taxes, given optimal behaviour by taxpayers, certainty, a perfect capital market, and the absence of intergenerational transfers, a lifetime wealth tax base could be obtained. Figure 3-1 provides the key to understanding how this would work.[11]

As mentioned above, in the special case of a taxpayer who chooses equal consumption in the two periods, a progressive annual expenditure tax involves no intertemporal distortion. To extend this neutrality from point *E* over a wider range, all that is required is to allow saving and borrowing to occur from point *E without tax consequences*. Then the taxpayer will be able to move up or down a new budget constraint tangent to the progressive annual expenditure tax budget constraint, without experiencing any departure of the after-tax rate of return from the before-tax value, as shown in Figure 3-2.

To see how the Blueprints lifetime consumption tax system works, we must think of the progressive annual expenditure tax budget constraint in a new way. Consider a tax system where the taxpayer has the choice between saving in "registered" or "nonregistered" (tax-prepaid) form. Registered saving produces an immediate tax deduction but also an increased tax liability when dissaving occurs in the second period. (Our RRSPs and RPPs provide an approximation to this form of registered treatment.[12]) This saving is therefore treated as it would be under a progressive annual expenditure tax. (Under the latter, saving is deducted from income in the first period to arrive at the tax base, and dissaving augments the tax base in the second period.) Thus the concave budget constraint in Figure 3-1 describes the consumption choices available if all saving is in registered form.

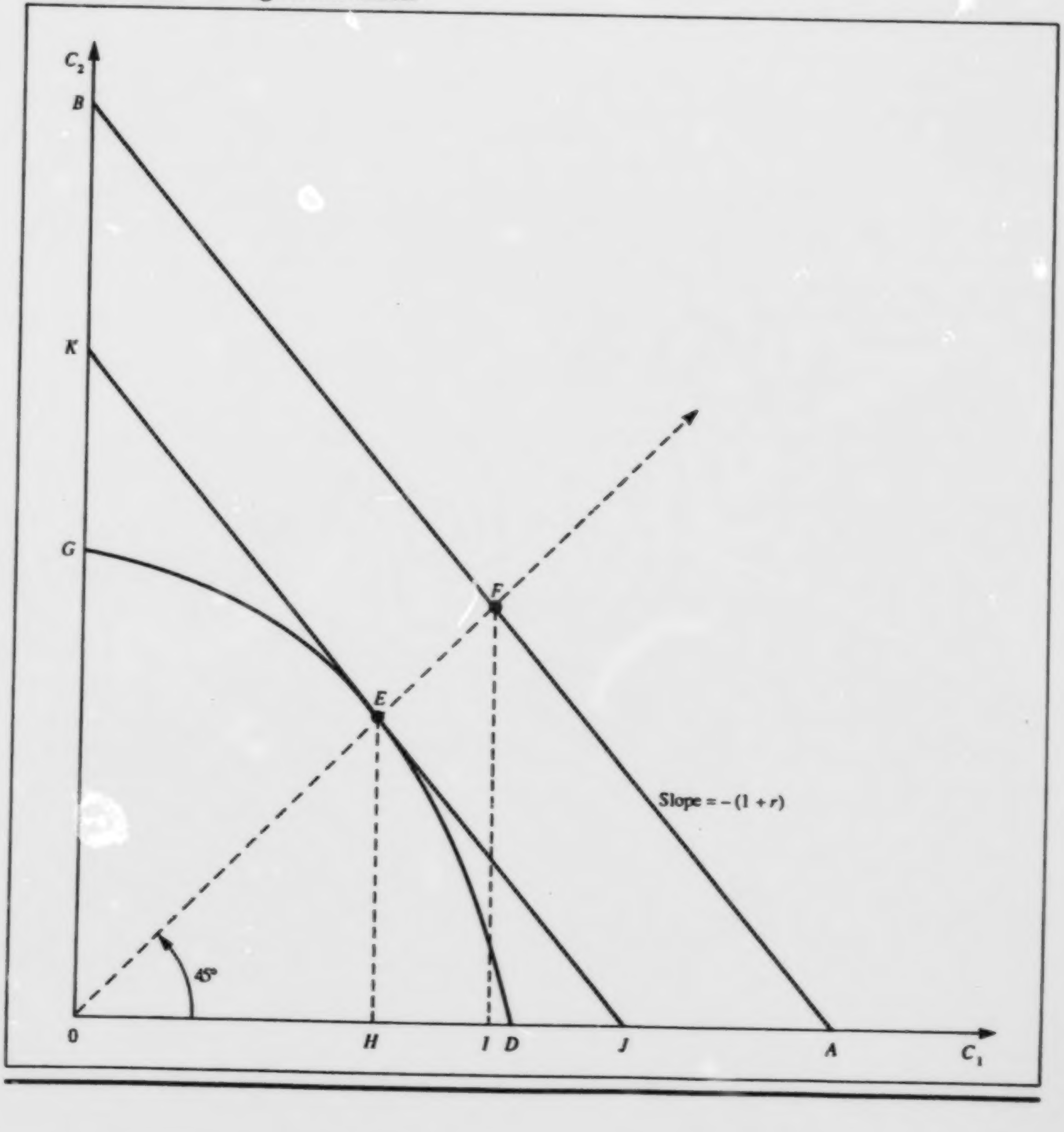
Nonregistered saving would be treated quite differently. No deduction would be allowed, but neither the income from, nor dissaving of, savings in the future would be taxable. This tax-prepaid treatment is precisely the approach one has under a wage tax. Thus a system that allows the taxpayer to put some assets into registered accounts and leave some outside simply allows the election of expenditure tax treatment for some assets and wage tax treatment for others.

There is another useful way of viewing the distinction between registered and nonregistered treatment. Both may be regarded as essentially taxing consumption, with the difference that under nonregistered treatment the consumption tax is "prepaid." Since in the nonregistered case no deduction is allowed for saving, it is as though the component of income which is saved is taxed in anticipation of the (otherwise tax-free) consumption it will allow in the future.

Starting at point *D* in Figure 3-2, the individual saving for retirement could do so either in registered or nonregistered form. However, initially it will always pay to use registered accounts. This is because with $\tau_2 = 0 < \tau_1$, the after-tax return on registered assets exceeds the before-

Figure 3-2

Registered and Nonregistered Assets



tax rate of return (which is always the net rate of return on nonregistered assets since the income they produce is tax-free). All saving will occur in the registered form until $\tau_2 = \tau_1$, that is up until E on the 45° line. From that point on, if further saving is desired it will be done in the nonregistered form, earning the rate of return, r, which will exceed that obtainable in registered form (since above E, $\tau_2 > \tau_1$). It is also clear that some individuals may wish to *borrow* starting at point E, that is to move down the line JEK. These people will hold positive assets in registered form, but debt in nonregistered form.[13]

It is also easy to show that all taxpayers who have equal lifetime wealth before tax will have the same budget constraint JEK.[14] Thus this system allows individuals to be taxed on the basis of their lifetime wealth.

One possible problem with this system is that some taxpayers may not optimize. Those who do not understand how to make efficient use of registered and nonregistered assets will end up paying higher lifetime taxes. Another difficulty is that to make sure that no one's intertemporal choice is distorted, taxpayers should be able to borrow considerable amounts in nonregistered form.[15] If for some reason this is not possible, some taxpayers may end up at a "corner solution" where they would like to borrow more than they are allowed, and some may not even make sufficient use of the registered asset to minimize lifetime tax burden.

How do matters change when intergenerational transfers are taken into account? If the aim is to exempt bequests and tax only lifetime consumption, no modification is required. When assets are transferred between generations, they retain their registered or nonregistered status.[16] If the aim is to tax lifetime wealth, that is, bequests are regarded as consumption, matters would be quite different. Registered assets would be regarded as "cashed out" on death. (This corresponds to current treatment of RRSP/RPP balances on death, except for interspousal transfers.) On the other hand, no adjustment for nonregistered assets would be necessary in the hands of the donee. However, all gifts and inheritances, from whatever source, would be treated as ordinary income of heirs for tax purposes. If avoidance of immediate taxation were desired, a transfer could be deposited, in whole or in part, in a registered account. But this form of tax planning does not differ in principle from that with respect, for example, to earnings.

One important aspect of using the registered-nonregistered approach to tax lifetime wealth is that taxpayers desiring to make substantial bequests, yet operating below the top marginal tax rate for a significant part of their lifetime, will not be content to leave assets destined for bequest in registered form until death. They will be able to reduce their lifetime tax burden by transferring such assets into nonregistered form (or simply giving them to heirs) gradually over their lifetime. If the class of assets that qualified for nonregistered treatment were to be restricted, the system could result in capital market distortions, where the amount that people wished to invest in the qualifying nonregistered assets would be artificially enlarged.[17]

The beauty of the Blueprints proposal, from a Canadian perspective, is that our PIT already approximates the proposed system to a surprising extent. Not only our RRSPs and RPPs, but also the tax treatment of human capital investment, are to a large extent on a registered basis.[18] Housing, on the other hand, is treated as nonregistered, just as are the financial assets producing the first $1,000 of interest and dividends, and the assets generating exempt capital gains.[19] It is also the case that borrowing may occur in nonregistered form without any limit.

Tax reform, thus, might be seen simply as a process of lifting constraints on the use of the registered and nonregistered tax treatments. The tax reformer would argue, for example, for increases in RRSP/RPP contribution limits and in the interest and dividend deduction, and for allowing any asset to be held in an RRSP. Also, taxation of unincorporated business income on a cash-flow basis, which provides effective registered treatment, would likely be advocated.[20] A whole strategy for reform, whether wholesale or incremental, is immediately apparent.

However, even if one accepts the desirability of the lifetime wealth or lifetime consumption tax base, there is at least one important simplifying assumption underlying the Blueprints solution that may be far too unrealistic. This is the constancy, certainty, and uniformity of rates of return (the so-called "perfect capital market" assumption). If rates of return are uncertain, so that some investments lead to the possibility of windfall gains or losses, there emerges a conflict between *ex ante* and *ex post* equity that may have serious consequences for the Blueprints proposal.

Under the full-blown Blueprints proposal a taxpayer would be able to choose either registered or nonregistered treatment for any asset. This would mean, for example, that $1,000 worth of shares could be set up in nonregistered form, and if a $10,000 capital gain was made on these shares it would never be taxable. The $10,000 capital gain can of course be consumed, and this raises *ex post* lifetime wealth above that of another investor whose affairs are exactly the same but does not achieve such a high capital gain. Individuals may conceivably amass vast fortunes, consume very large amounts, and yet pay little tax under the Blueprints form of consumption tax simply as a result of holding rapidly appreciating assets in nonregistered rather than registered form.

An extreme response to the failure of the Blueprints proposal to guarantee *ex post* equity would be to prohibit the holding of most assets that may produce nominal capital gains (stocks, real estate, bonds, etc., but not owner-occupied housing) in nonregistered form. However, not only would this approach create great administrative complexity, it would not really achieve *ex post* equity. A taxpayer could, for example, have a low income through much of his lifetime but experience a large capital gain in retirement. If the asset involved was held in registered form, this would produce a considerable increase in tax liability, and the individual would bear a larger lifetime tax bill than another taxpayer with equal gross lifetime consumption but a properly smoothed-out time path of taxable income. While the Blueprints system can be used to produce an *ex ante* progressive tax on lifetime wealth, it does not appear possible to modify it in any simple way so that it also yields a perfect *ex post* progressive tax on lifetime wealth. This is a drawback if one subscribes to notions of *ex post* rather than *ex ante* equity.

A further undesirable consequence of limiting the class of assets that may be held in nonregistered form would be a significant capital market distortion. If taxpayers wish to make considerable use of nonregistered tax treatment, savings in the form of safe assets such as bank accounts, savings bonds, and investment certificates would be artificially encouraged at the expense of savings in more risky assets.

If we wish to tax bequests, the capital market distortion that would be caused by limiting nonregistered treatment to safe liquid assets and equity in owner-occupied housing and consumer durables could be seriously exacerbated. As pointed out earlier, if the marginal tax rate is monotonically increasing in "taxable income," then estate planning under the Blueprints system would entail transferring assets that are to be bequeathed from registered to nonregistered form over many years, so that the marginal tax rate in the year of death would be no higher than at any other point in the lifetime. With strict limitations on which assets could be nonregistered, this would lead to possibly severe distortions in portfolio choice.

Due to these serious drawbacks from limiting the class of assets that may be held as nonregistered, we would recommend that the original Blueprints proposal of free choice in the designation of assets as registered or nonregistered should be accepted. The problem of a failure of *ex post* equity can be better addressed in our opinion, as discussed in the next section, by ensuring that economic rents are taxed at the level of the firm, by means that are outlined later.

Implementing a Consumption Tax

Theoretically, there are several different ways in which we could move towards a personal consumption tax in Canada. These would be to replace the current personal income tax, and possibly other taxes including corporate income tax, by one or more of the following: 1) a general sales tax or consumption-type value-added tax (VAT); 2) a progressive annual tax on consumer expenditure;[21] 3) a progressive annual "wage tax"; and 4) a Blueprints system of registered and nonregistered assets – a *lifetime* consumption tax. Within each variant there would be important choices to be made. For instance, under approaches 2 and 4, a decision must be made whether to tax bequests and, under 4, one must decide whether to limit the use of nonregistered treatment. Also, the relationship to, and integration with, a corporate income tax is obviously very important.

In fact, the range of practicable alternatives is not as broad as suggested by the above list, since approaches 2 and 3 are not really feasible in pure form. A progressive annual tax on consumer expenditures would provide a Blueprints-type registered treatment for *all* assets. Owner-occupied housing, for example, could not continue to be treated as nonregistered. This would mean that the following complexities would be added to PIT: 1) down payments, mortgage payments of principal, expenditures on repairs, maintenance and improvements would all be deductible; and 2) proceeds from the sale of a house would be taxable. In our judgment, such innovations would likely be very difficult to implement.[22]

A progressive annual wage tax would also require some rather complicated and unappealing changes to the present system. For example, RRSPs and RPPs would be abolished. In addition, strict implementation would require a fundamental change in the tax treatment of human capital. As pointed out previously in this chapter, the current approach treats human capital essentially as a Blueprints-type registered asset. The forgone earnings and tuition fee costs of education and training reduce taxable income, and tax is levied on any "withdrawals" from the human capital account in the form of earnings. Under a strict wage tax this would be replaced by nonregistered treatment, requiring the following two conditions. First, the costs of human capital investment – forgone earnings, tuition fees, and other educational expenses – would not be deductible. (This would mean, for example, that someone with potential earnings of $20,000 but with no actual income due to spending the year in school would be assessed $20,000 of gross earned income.) Second, increases in earnings due to human capital accumulation would not be taxed. This would be even less palatable than taxing housing on a registered basis.

The upshot of these various barriers to annual expenditure or wage taxes is that any real-world tax system will be one in which some major assets are given registered treatment (pension savings, human capital), and others are given nonregistered treatment (housing). It can therefore be argued that the only practicable method of consumption taxation is some kind of expenditure tax – wage tax hybrid.

That the only practicable method of consumption taxation (aside from general sales tax or VAT) involves a mixture of registered and nonregistered treatment does not mean that the Blueprints approach is the only feasible one. Unnecessary restrictions on the choice of registered vs. nonregistered treatment, or mishandling of bequests and inheritances, could mean that a system where all assets were treated either as registered or nonregistered could nonetheless be quite different from the Blueprints-type consumption tax. In addition, if other taxes are levied on consumption or earnings (e.g., sales and excise taxes and social security taxes), the overall tax system will not be on a lifetime consumption tax basis, even if the personal income tax system has been transformed into a Blueprints-style personal expenditure tax.

Sales Tax or Value-Added Tax

As indicated in Chapter 2, there is considerable reliance on indirect taxation at both the federal and provincial levels in Canada. With the exception of Alberta, the provinces all levy retail sales taxes, while the federal government imposes a manufacturers' sales tax (MST). Successive federal governments have toyed with the idea of reforming MST. In fact, it was announced in the federal budget of November 1981 that MST would be moved to the wholesale level. However, disenchantment with this proposal took hold rapidly, and it was abandoned. The Conservative government elected in September 1984 has given serious consideration to replacing the MST with a broadly based consumption-type VAT.

It is beyond the scope of this study to compare the merits of a sales tax and VAT, or the difficulties in federal-provincial relations that might be created by a federal move towards a retail sales tax or VAT. Suffice it to say that, in principle, a retail sales tax and a VAT can both be designed to fall, to a close approximation, on aggregate consumption expenditures, and that systems of federal retail sales tax or VAT have both been given serious consideration and appear to be within the realm of possibility (with or without integration of federal and provincial systems). The interested reader may see, for example, Due (1986) or Cnossen (1986) for further details.

The current provincial sales taxes and MST in Canada fall considerably short of the CT ideal. A large part of their revenue is in fact obtained by taxes on capital goods and intermediate inputs, although broad categories of such goods are exempt. In addition, of course, the MST is not levied at the retail level, so that variation in wholesale and retail "margins" make its effective rate from the consumer's point of view nonuniform. A wide range of consumer goods – for example, food, children's clothing, home heating fuels, and housing – are either exempt or taxed at preferential rates. (See, for example, Boadway and Kitchen, 1984, Chapter 5, for further details.) The latter provisions are intended to mitigate the perceived regressivity of the taxes. Their power to introduce some progressivity, however, is seriously sapped by the taxation of capital goods and intermediate inputs, which spreads the burden of the taxes onto goods exempt at the final level. (See Davies, 1986*c*, for a discussion of the distributional impact of the federal MST, taking into account such effects.)

While current sales taxes in Canada fall considerably short of the CT ideal, this could in principle be corrected – for example, by replacing all of these taxes by an integrated federal-provincial consumption-type VAT. Supposing that this was done, there would be at least two limitations of the approach which constrain reliance on it in a consumption-tax-oriented reform. First, a sales tax or VAT would not be related to taxpayers' characteristics, other than their expenditure patterns. While some progressivity can be achieved by exemptions and differential tax rates, this is a relatively crude tool in distributional terms (Davies, 1986*c*), and it also creates a nonuniform and possibly quite distortionary tax structure. Second, if one prefers a CT approach under which bequests are taxed, the sales tax or VAT approach does not give the desired base (i.e., bequests are not taxed). These two problems imply a need for direct taxes at the personal level to be implemented alongside a sales tax or VAT. The lack of progressivity of the sales tax or VAT can readily be corrected under PIT by the use of refundable credits meant to compensate poor families for indirect taxes, and some taxation of bequests can be achieved under PIT as discussed in the previous section.

Despite the limitations of sales taxes or VAT, they have an important role in overall CT reform, since they can in turn compensate for some of the difficulties under PIT. First, as discussed below, there are avoidance difficulties under Blueprints-style PIT (as there are under any personal tax system). It can be argued that it is more difficult to avoid sales taxes or VAT. In any case, the people who avoid one tax may be caught by the other. Second, those who benefit from windfall gains on nonregistered assets, and therefore pay lower PIT over their lifetimes than their consumption would warrant (as discussed earlier), will at least pay sales tax or VAT when they spend the proceeds. Thus sales tax or VAT may be advocated on equity grounds as an effective form of "minimum tax."

Our conclusion is that a broadly based sales tax or VAT would be an attractive supplement for a direct personal tax under consumption tax reform in Canada.

Lifetime Consumption Tax

The discussion in the first section of this chapter revealed that there are two major variants of the Blueprints lifetime CT scheme, depending on whether bequests are taxed. The main features of these schemes are laid out in the first part of Table 3-1.

As shown in Table 3-1, both variants of the Blueprints scheme treat owner-occupied housing and consumer durables as nonregistered assets;[23] tax human capital on a registered basis; tax gifts and inheritances received; and treat unincorporated business income on a cash-flow basis. Whether one opts for the lifetime consumption tax variant which taxes bequests is mostly a matter of personal value judgments. We therefore do not indicate a preference.

One of the advantages of the Blueprints-type lifetime CT reform is that it does not require a radical change in the methods currently used to tax such items as imputed rent and human capital. It is a highly *practicable* reform. We will now set out what changes in Canadian PIT would in fact be required to transform it into a Blueprints-type PET. They are not minor but, on the other hand, are entirely feasible. Changes that may be required in other portions of the tax system are discussed in the following subsection.

There are currently three main classes of assets from the viewpoint of Canadian PIT: 1) registered assets, including RRSPs, RPPs, and human capital; 2) tax-prepaid nonregistered assets, including financial assets producing the first $1,000 of interest and dividends as well as the first $1,000 of pension income, owner-occupied housing, and consumer durables; 3) taxed assets, including financial assets producing dividend and interest income in excess of $1,000 and pension income in excess of $1,000, unincorporated business equity, and assets generating capital gains in excess of the $500,000 lifetime exemption.

The first step in a lifetime CT reform would clearly be to abolish the taxed category of asset. This would be accomplished by allowing taxpayers to put all financial assets on a registered or tax-prepaid nonregistered basis and by putting the taxation of unincorporated business income on a cash-flow basis.

Note that allowing taxpayers to choose between registered or nonregistered treatment for financial assets implies the same choice for negative savings, that is, *debt*, as for positive savings. Nonregistered debt would not be of interest to the taxman. The acts of borrowing, paying interest, and repaying one's loan would have no tax consequences, just as saving in, receiving interest from, and paying for consumption out of nonregistered assets would have no tax consequences. This is a radical departure from current practice – the lucrative interest expense deduction would be completely abolished.[24] As if this is not sufficiently radical, borrowing in registered form would give rise to the opposite of the deduction obtained when funds are deposited in a registered account – that is, such borrowing would in fact be taxed. (Repayment of loans given registered treatment would be deductible and interest paid would neither be taxable nor deductible.)

While the requirements for borrowing to be possible in either registered or nonregistered form may seem unusual, it should be noted that they are important in ensuring that a lifetime consumption tax is actually secured. If registered borrowing is limited, optimal self-averaging will not always be possible.[25] If the interest expense deduction is continued, the lifetime budget constraint will have the wrong slope as surely as if a crude tax on capital income were levied. The only difference would be that the price of future consumption, rather than being artificially increased, would be artificially reduced.

The cash-flow treatment of business income is of considerable interest due to the great simplification that it offers, as well as for the neat way it extends lifetime CT treatment in this difficult area. Under cash-flow business income taxation, acquisitions of business capital give rise to an immediate deduction, just like contributions to a registered saving vehicle. And sale of business assets would produce taxable income, just as would cashing out from a registered account. There may appear to be some difference in the treatment of the income produced by capital in between these points. However, the treatment

Table 3-1

Personal Income Tax Treatment of Assets and Investment Income under Alternative Reforms

	Treatment of:						
Basic approach	Financial assets	Housing	Human capital	Inheritances	Bequests	Unincorporated business	Type of tax
Lifetime consumption tax					Taxed		Bequests taxed as part of lifetime consumption
	Registered or nonregistered*	Nonregistered	Registered (tax observed earnings, deduct direct education costs)	Taxed	Not taxed	Cash-flow basis	Lifetime consumption excludes bequests
Uniform annual income tax	Tax real accruals	Tax imputed rent	Tax forgone earnings, do not deduct direct costs, allow CCA on human capital	Taxed	Deductible	Tax real current business income	Ideal Haig-Simons approach
			Tax observed earnings, deduct direct education costs		Nondeductible		Conventional Haig-Simons approach
	Tax real realizations	Not taxed		Not taxed		Tax nominal current business income	Feasible approach

NOTE "Nonregistered" treatment here is synonymous with "tax-prepaid" treatment.
*Registered: deposits or acquisitions deductible, compounding income tax-free, withdrawals or sales taxed. Nonregistered: deposits, acquisitions, and sales not reported; income not taxed.

is, in fact, the same. It is true that capital income generated in the business is implicitly being added to taxable income year by year, *but only to the extent that it is not reinvested in the business*. The net withdrawal of capital income from the business does not necessarily increase tax liability, of course. There will be no barrier to this income being invested in some other registered form.[26]

Having abolished the fully-taxed category of assets, we may turn to the registered and nonregistered categories. With respect to the first, the lifetime CT reform would call for the replacement of RRSPs and RPPs by a single category of registered savings plans (RSPs). As in the present system an individual could have a number of RSPs with different financial institutions, but they would all have no limit on contributions and no requirement that they be cashed out at any point (except on death if bequests are taxed).

Advantages of Approach

As discussed already, one of the great advantages of the Blueprints approach, relative to the UIT approach, is that it does not require us to try to tax some forms of income that have previously gone untaxed – for example, imputed rent on owner-occupied houses – and it does not require shutting down the well-entrenched sheltered savings schemes – RRSPs and RPPs. Three other considerable advantages now become apparent:

1) There is no need to tax accrued capital gains. The proceeds from the sale of an asset are made fully taxable (unless reinvested). Thus the cash flow that ideally should be taxed is measurable and fungible (in contrast to accrued capital gains, which are not fungible and are often difficult to measure).

2) There is no need to try to identify the inflationary component of investment income. For nonregistered assets the investment income is simply not taxed. For registered assets what is taxed is the withdrawal of resources for consumption (or transformation into nonregistered form). It is always appropriate to tax the entire withdrawal, whatever the level of inflation.

3) It is not necessary to assess capital costs in computing the taxable income of businesses. This greatly simplifies taxation for unincorporated businesses.

Thus the lifetime CT reform, unlike most tax reform proposals, is genuinely simplifying. If simplicity is really as highly prized as economists and policy makers assert, and if the lifetime CT reform is also believed to be equitable and to minimize the distortionary impact of taxation (an issue to be discussed in the next chapter), it appears extremely attractive.

Disadvantages of Approach

It has been perceived by some (e.g., U.S. Treasury, 1984, pp. 200-10) that the CT approach set out here suffers from certain major disadvantages, with the most serious centring on deterioration of horizontal and vertical equity. In our opinion, there are indeed some difficulties, but they appear to us less serious than has sometimes been claimed. In our view, the equity problems associated with CT reform may even be less serious than those that would accompany true UIT reform.

It is often perceived that the CT approach would reduce vertical equity. This view receives some impetus from the observation that saving rates rise with income, so that a shift from an annual income tax to an annual consumption tax would reduce progressivity. This argument ignores three important points: 1) the tax schedule can be adjusted to maintain progressivity; 2) our current tax system is perhaps closer to a consumption tax than to an income tax, so that the magnitude of the change is not as great as in going from a true income tax to a consumption tax; and 3) saving rates fall less sharply with lifetime than with annual income. Since we are discussing the implementation of a lifetime consumption base, the latter point appears particularly important. If, further, the consumption tax variant under which bequests are taxed were adopted, it is far from clear that progressivity in any appropriate sense would have to decline. (A much more detailed discussion is provided in Chapter 7.)

The horizontal equity issues are largely associated with the widely advertised difficulties of *transition* under the CT approach. These are of two types. First, any change in the differential taxation of various assets will lead to windfall gains or losses as the altered tax status is capitalized in the value of the asset. Second, in a shift to a consumption tax base, it may appear that those who were elderly at the time of tax reform would suffer a major windfall loss (younger groups reaping a corresponding gain) since their consumption is relatively larger than their income.

While the horizontal and intergenerational equity problems in transition are worth serious study, we believe that they can easily be exaggerated. Windfall gains and losses will occur whenever capital income tax provisions are altered. Given the proximity of our current personal income tax to a consumption tax, we are not convinced that these gains and losses would be enormous, or that they would be greater than in a Carter Commission-style UIT reform. To take a case in point, as we have outlined above, the tax treatment of housing in Canada would not change under CT reform. In contrast, under UIT reform, in principle, imputed rent would have to be taxed, likely leading to major capital losses for homeowners.

On the intergenerational front, concern has been inflated by studies in which the impact of consumption taxation is analysed on the assumption that *all* assets would be treated as if they had been registered at some point in the past, once the consumption tax regime came into force (e.g., Summers, 1981; and Auerbach et. al, 1983). Thus, the elderly would be fully taxed not only on their withdrawals from RRSPs and RPPs, but on their dissaving in any form. This is virtually a parody of the CT reform we have set out and which is generally advocated. Our proposal would in fact *reduce* the tax liabilities of the elderly, under an unchanged tax schedule, since their registered savings would be treated precisely as at present (except that timing of withdrawals would not be regulated), and they would escape tax entirely on income from their nonregistered assets. Of course, the tax schedule could not be maintained unchanged; the aggregate tax base would shrink and rates would have to be increased. The elderly would likely experience some increase in tax burden as a result, but it would be far less of an increase than has been projected on the basis of naive analyses of what is involved in CT reform.

Another possible disadvantage of the lifetime consumption tax, it has been suggested (Goode, 1980, p. 67), is that in one respect it could ease the difficulty of tax evasion. One of the problems with capital gains taxation has always been that it is possible to conceal the sale of assets. A similar difficulty could arise under the consumption tax with respect to the sale of registered assets. (U.S. Treasury, 1984, p. 204, argues that this problem would be particularly severe if the assets in question were located abroad.) In fact, the problem would be more serious under the consumption tax since it is the entire proceeds of the sale of a registered asset that ought to be taxed, not just the appreciation in value. In our view, this consideration argues for a system similar to that currently in force for RRSPs and RPPs in Canada, where major financial institutions administer most registered assets and report withdrawals directly to the tax authorities.

Finally, it has been argued that taxpayers may see the Blueprints-style consumption tax as inordinately complex and inequitable. The typical taxpayer, it is thought, will not understand the self-averaging properties of registered assets. In our view, concern on this point is exaggerated. Canadians have long experience with RRSPs and RPPs, and they appear to fathom their tax advantages pretty well. Perceptions of inequity would no doubt arise in a system of progressive annual consumption taxation, where young families with children, for example, displaying relatively low saving rates, would be taxed more heavily than families aged, say, 45 to 60 with similar incomes but able to save at a higher rate. The Blueprints-style consumption tax avoids this apparent difficulty since current tax burdens are not determined by current consumption. Many young families would be simultaneously saving in registered form and borrowing in nonregistered form, thereby bringing their current tax burden more into line with that of households free of childrearing responsibilities. Another way of putting this is that each family will arrange its registered asset contributions to obtain a constant marginal tax rate over the lifetime. With smooth graduation of marginal tax rates, this implies a fairly constant profile of actual tax payments over the lifetime.

Changes in Taxes Other than PIT

As sketched above, under a lifetime CT reform it is to be hoped that current federal sales and excise taxes would be replaced by a general retail sales tax or VAT. What accompanying changes should occur in other parts of the overall tax system, that is, in social security, property taxes, and CIT?

If the motivation for a lifetime CT reform is primarily to achieve equity, then the reformed tax system is urged on the grounds that the burden of government expenditure should be divided according to the lifetime consumption of different taxpayers. It would appear to follow that all taxes aside from PET, general sales tax or VAT, and taxes that have a benefit-related rationale should be scrapped. Reforms of social security taxes, which already exhibit a degree of benefit-relatedness, a considerable reduction in the reliance on municipal property tax, and an integration of CIT with PIT would therefore be urged.

That advocates of lifetime CT have paid little attention to reforms outside PIT and CIT may reflect a judgment that these are secondary in importance or less likely to be adopted. On the other hand, much of the impetus behind the lifetime consumption tax proposal is aimed at increasing efficiency. If the overriding goal is to eliminate intertemporal distortions, then whether, for example, it is equitable to collect funds to pay public pensions by levying a regressive tax on earnings, as under the Canada pension plan (CPP), is not very interesting. Outside PIT, essentially the only taxes of any concern are the municipal property tax and CIT. Again, a reduction in the use of property taxes to the point where they could reasonably be claimed to cover only municipal services to property (street lighting, sewers, etc., but certainly not public education, parks and recreation, and so on) would be advocated. However, as we see below, when it is only efficiency that is of concern, there is more than one possible reform of CIT under the CT approach.

Before examining proposed reforms to CIT, a few observations with respect to social security taxes are in order. These are fairly sizable in Canada – 11.2 per cent of total government revenue in 1981. Since these taxes are levied on labour incomes only, our reliance on special social security taxes to pay for assistance to the unemployed, part of state pensions (i.e., the part supplied under CPP), and (in some instances) medical care reduces the reliance that must be placed on PIT and CIT and, therefore, the tax burden that is placed on investment income. If all we are concerned about in consumption tax reform is reducing the burden on capital income, then the existence of these supplementary wage taxes is desirable. However, if one is aiming at a lifetime wealth tax base (i.e., takes equity as an important consideration), these taxes will be viewed askance unless put on a much stricter benefit-related basis.[27]

Supplementary taxes on labour income discriminate between earnings and the other sources of lifetime wealth – inheritances and government transfers. This is especially the case where bequests are not taxed. In that case, whereas, for example, inheritances in registered form would not be taxed if entirely bequeathed, earnings would always be subject to a minimum tax (i.e., the social security levies), whatever the portion of lifetime earnings bequeathed.

Corporate Income Tax

From the viewpoint of the lifetime consumption tax advocate, in the absence of windfall gains and losses – that is, "economic rents" – there would be no rationale for CIT on equity grounds. If shareholding takes place in registered form, the income generated within corporations will be taxed as it gives rise to additional consumption or bequest. If shares are nonregistered, tax is fully prepaid. If CIT continued in place, complex arrangements to more fully integrate CIT and PIT would be required – simply with the aim of undoing under the PIT what had been done by the CIT! With this kind of argument in mind, abolition of CIT was recommended in the Blueprints report.

While the pure lifetime consumption tax system does not require a CIT, there are a variety of arguments for adopting some form of CIT in real-world consumption tax reform for equity and efficiency reasons. For example, it is often argued that a CIT levied on income accruing at the corporate level makes sense as a withholding tax against foreigners – a possibly very significant point in a country with a high degree of foreign ownership. CIT levied on foreign subsidiaries, it is suggested, may come largely at the expense of foreign governments, via a "treasury transfer effect," and may have little investment incentive effect. We are sceptical of such arguments for reasons set out in Chapter 5.

There are also arguments for implementing a CIT designed to fall on economic rents accruing at the corporate level. These arguments are essentially equity-based but are considerably strengthened by the fact that true rent taxes are nondistortionary. That is, a CIT designed to fall on rents would improve equity without any deterioration in efficiency. The method that has been widely proposed to achieve this is a cash-flow CIT (Boadway et al., 1982).

Under the cash-flow approach to CIT, all depreciable property would be immediately expensed, but no deduction would be allowed for depreciation or interest. Also, instead of trying to compute the value of goods taken from inventory for current production, the accounting procedure would simply be to allow a deduction for current additions to inventory. In a present-value sense, tax liabilities would be the same as if ideal inflation-proof accounting of capital expenses was implemented and an allowance made for the cost of shareholders', as well as debt-holders', capital.

The difficulty identified in the previous section with respect to *ex post* equity under the Blueprints-style PIT provides a powerful motivation for a cash-flow tax at the corporate level. As discussed earlier, one major problem with the nonregistered treatment of assets is that there is no opportunity to tax consumption out of windfall gains. The severity of this problem is clearly reduced with a cash-flow CIT. (Recall that the problem does not arise under the recommended cash-flow taxation of unincorporated business, which puts investment in that sector automatically on a registered basis.) That some shareholding would occur in registered form, with the result that corporate rents would be subject to double-taxation, appears to us much less serious than allowing rents to be tax-free for nonregistered assets.

Finally, again on the basis of an equity argument, it should be noted that there is an especially strong case for the use of cash-flow taxation with respect to the resource sector. (Since we favour the use of a cash-flow CIT as part of the consumption tax reform, we do not recommend a separate tax for the resource sector.) If natural resources are viewed as part of the "common property" of the nation, there is a good case for levying a tax designed to appropriate some of the returns to that property for the general public.

Implementing a Uniform Income Tax

Just as in the case of consumption tax reform, there are a number of different possible uniform income tax reforms. Three variants are shown in Table 3-1.

The first possible variant of UIT reform would tax strictly according to annual Haig-Simons income, with all forms of investment income taxed on a real accrual basis, human capital treated just like any other form of capital, and inheritances taxable. In Table 3-1 this is referred to as the "ideal" Haig-Simons approach. Note that we have also included deductible bequests as a feature of the ideal Haig-Simons approach. In fact, as discussed earlier in this chapter, it is not really clear, conceptually, whether bequests should be subtracted in computing Haig-Simons income.

The ideal Haig-Simons approach set out in Table 3-1 is nonimplementable for reasons set out in detail below. As a second variant of UIT reform, we therefore set out a "conventional" Haig-Simons reform meant to represent the type of reform that is actually urged as an appropriate target by uniform income tax advocates. This approach drops the deductibility of bequests but keeps inheritances taxable (since they are clearly part of Haig-Simons income and are relatively easy to measure and tax). Any notion of treating earnings as a form of capital income is abandoned. The major departures from the current tax practice which are urged are the taxation of imputed rent on owner-occupied housing and full taxation of all income from financial and business assets (e.g., capital gains) on a real accrual basis.

As a final variant of UIT reform we show a set of options that we believe describe a "feasible" approach. For reasons described below, we do not believe that it is possible to tax imputed rent and real accruing investment income accurately and fairly or at a reasonable administrative and compliance cost. Feasible UIT reform, therefore, boils down to taxing fully financial and business income on a real realized basis. Even this reform encounters considerable difficulties, which are described below.

Implementing a uniform income tax is in some ways easier, but in most ways more difficult, than moving to a lifetime consumption tax. We have emphasized above that a move to a lifetime consumption tax results in considerable simplification of the PIT system. It is also true that transforming PIT into UIT would be very difficult, as discussed below. However, there is one important respect in which it is easier to implement the true income tax approach than the consumption tax approach. This is in the area of what changes are made in the bulk of the tax system which lies outside PIT.

In the lifetime consumption tax reform, we saw above that it is necessary to make sales and excise taxes equivalent to a uniform retail sales tax, to put CIT on a cash-flow basis, and to reform property taxes and social security taxes to put them on a true benefit-related basis. Ideally, wide-ranging changes should also accompany UIT reform. However, failure to achieve reforms in other areas would in an important sense be less serious to a UIT advocate.

The lifetime CT advocate is interested in reform not only to achieve greater equity, like the UIT supporter, but also to eliminate intertemporal distortions. Lack of property tax and CIT reform therefore concerns the lifetime CT advocate for an additional reason. The vertical equity implications of such lack of reform can be offset, to some extent, by changes in the PIT tax schedule. For example if the property tax is regressive, we can make PIT a little more progressive in rough compensation. However, it is much more difficult to offset the intertemporal distortion created by the implicit taxation of capital income outside PIT involved in the property tax and CIT (without full integration).

Major Changes in PIT

As we saw above in the discussion of the consumption tax approach, current tax treatment of different kinds of investment income (including the return to human capital) is exceedingly diverse. While the diversity implicit in the registered/nonregistered dichotomy can be retained in the CT approach, under the true UIT approach the aim is complete uniformity of treatment.

In a strict UIT reform, as indicated in Table 3-1, the following major changes would be made in the taxation of investment income in the Canadian PIT:

1) All forms of investment income would be fully taxed on a current accrual basis. This means that the registered and tax-prepaid nonregistered assets would be abolished, and capital gains would be taxed as they accrue rather than as they are realized. The following items would be fully taxed on a current basis: all assets now held in RRSPs and RPPs; human capital; financial assets now producing the first $1,000 of interest and dividends and the first $1,000 of pension income; owner-occupied housing and consumer durables; and capital gains on all assets,

including owner-occupied houses and items of personal use.

2) The taxation of all forms of investment income would be inflation-proofed. This requires that the purely inflationary component of all nominal investment income be allowed as a deduction; changes be made in the assessment of unincorporated business income to correspond to those under CIT, to be discussed later; and only the real component of interest paid on debt taken out to finance investments be deductible.

Needless to say, these changes could not be accomplished painlessly. It has frequently been argued that their implementation is so difficult that any reasonable approximation to a uniform income tax is impracticable. Taxing the return from human capital on a UIT basis, to begin with, would be infeasible. This would require, for instance, that a full-time student with potential earnings of $25,000 in a year should pay the same tax as someone actually earning $25,000 (and not investing in human capital). Taxpayers would also be allowed capital cost allowances and interest cost deductions for their human capital. To tax the cash flow in the form of earnings from human capital, as under our current PIT, allows human capital consumption tax treatment. That so few believe that human capital should be treated otherwise perhaps indicates that there is more underlying support for the consumption tax approach than is often believed. And although it would be possible to shut down RRSPs and RPPs completely, as in the human capital case, these features are a long-established consumption tax feature of our PIT, enjoying widespread popular support. Their removal could well be regarded as outside the realm of practical possibilities.

Extension of UIT treatment to owner-occupied housing would require the inclusion of imputed rent in taxable income. It does not seem feasible to do this in any satisfactory way without very large administrative costs. The only practicable approach is to somehow obtain estimates of property values and obtain gross "imputed rents" by multiplying these values by a common factor. In the United Kingdom, prior to 1963, municipal property tax assessments were used as a basis for taxing imputed rent under PIT. A similar approach is not really feasible in Canada because of the very large variation in the true market values relative to assessed values (Thirsk, 1982, pp. 387-89). Thus reliance on appraisals submitted by taxpayers appears inevitable.

Finally, as indicated above, the UIT approach requires, strictly, that capital gains on all assets should be taxed, and that this should be done on an accrual basis rather than on a realization basis. In addition to the concerted opposition to taxing capital gains on owner-occupied housing and other capital gains now tax-free, an attempt to implement such an approach would lead to an administrative and compliance nightmare for all assets whose value is difficult to ascertain – essentially everything other than stocks and bonds. Requiring taxpayers to submit professional appraisals – perhaps on all items over a certain value or once every three years – would impose significant compliance costs without much guarantee of equitable tax assessments. The inherent uncertainty with respect to the value of, for example, real estate, shares of private corporations, art and antiques, etc., would inevitably lead to errors in assessment but also create room for the submission of appraised values below fair market value.

It is worth contrasting these difficulties with the simplicity of the consumption tax approach. Under the latter, there is no need to change the current tax treatment of human capital, RRSPs, RPPs, and owner-occupied housing. No costly and politically unappealing attempts to extend PIT to tax these items along income tax lines are necessary in principle or in practice.

The contrast with respect to capital gains is possibly even more striking. Under the CT approach, far from difficult annual calculations of nominal and real capital gains being required, it is never even necessary to compute a capital gain. If registered shares are sold, for example, whatever portion is used to fund consumption (or transferred into nonregistered form) is taxed. There is no need to distinguish between the portion of the share value that represents the initial purchase price and the part that represents capital gain.

A final point that must be argued is that, as pointed out by Feldstein (1976, pp. 94-97), the costly attempts to ensure that all forms of investment income are given uniform PIT treatment described above (and in the following subsection) may actually *cause*, rather than remedy, horizontal inequity. To see the nature of the argument, assume that the effective marginal tax rate on any given asset is the same for all taxpayers, but that these rates vary across assets. Then in capital market equilibrium, neglecting risk, before-tax rates of return will differ according to differences in effective marginal tax rates, so that the after-tax rates of return on different assets are the same. In other words, a taxpayer suffers no disadvantage from holding an asset with a higher effective marginal tax rate. Further, a move to uniform rates will cause horizontal inequity in the form of windfall gains for those holding assets previously heavily taxed and losses where taxation was originally light. Then the real argument for uniform tax rates across assets must be made on efficiency grounds – uniformity is required for technical efficiency in production (factor price ratios should be equal across industries and activities).

"Inflation Proofing" PIT

As indicated in the previous subsection, inflation proofing the taxation of investment and business income under PIT would require: 1) making the purely inflationary component of nominal investment income deductible; 2) accounting for business income on an inflation-proof basis; and 3) allowing the deduction of only the real component of interest on debt incurred to finance investment. These steps involve a considerable increase in tax complexity and compliance cost.

The deduction of the purely inflationary component of investment income raises two difficulties in compliance. First, when an asset is owned throughout the tax year, it is easy to compute the inflationary component by applying the sanctioned inflation rate to the initial value of the asset (assuming the latter is easily established). However, when assets are bought and sold during the tax year or ownership fluctuates – as in the case of bank accounts – the inflation rate has to be applied to the separate items in the portfolio on something like a daily basis. For large investors, the increased computational costs may not be large – brokers and financial institutions can use cheap and essentially universally available data-processing technology to keep the required running totals. Large compliance costs as a proportion of income may, however, be imposed on small investors.

The second compliance difficulty created by the inflationary component deduction is more serious. In order to compute the change in value of an asset purely due to the general rise in the price level, it is necessary to know the initial fair market value. Hence the apparently prohibitive administrative and compliance costs associated with annual valuation of assets for capital gains tax purposes, discussed above, are again encountered.

Allowing the deduction of only the real component of interest on debt incurred to finance investment would be somewhat more straightforward. The value of debt is unambiguous and easily established (by the taxpayer at least). Where outstanding debt fluctuated much within the tax year, compliance costs associated with increased record keeping would not be totally insignificant but, given the current state of data processing in the financial sector, would likely not be prohibitive.

We have not discussed here the difficulties of inflation proofing the computation of business income, since they are the same as in the case of corporate income, which are discussed below. Suffice it to say that these difficulties are severe. The overall conclusion is thus that the inflation proofing required under uniform income tax is not cheap.

Again, note the contrast in administrative and compliance difficulties under the UIT and CT approaches. None of the difficulties associated with inflation proofing described arise under the consumption tax approach, since there is no need to separate the real and purely inflationary components of investment income. As pointed out in the discussion of capital gains above, investment incomes are only taxed as part of the cash out from registered assets, and it is only the size of the cash out, not its composition, that matters for tax assessment.

CIT Changes

As noted in the previous chapter, there is an attempt at some integration of CIT and PIT in Canada. The dividend tax credit compensates to some extent for the corporate tax already paid on the income giving rise to a dividend. (As pointed out earlier, often *overcompensation* occurs.) Also, the one-half taxation of capital gains and $500,000 capital gains exemption clearly reduce the "double-taxation" of retained earnings. Under ideal implementation of the UIT approach, applying the partnership method, the portion of retained earnings that could be imputed to a taxpayer's shares would be included in his/her gross income for PIT purposes, and a credit equal to the corresponding share of CIT payments made would be received.[28]

Note that the full integration scheme would necessitate complex changes in capital gains taxation to achieve ideal UIT treatment. In the absence of rents, if share values reflected corporate equity straightforwardly, the increase in value of one's shares over the tax year would equal one's share of retained earnings for that year. To tax capital gains (even if only when realized) in addition to retained earnings would therefore be unnecessary (and inequitable). A form of double-taxation would be imposed.

Simply repealing capital gains taxation on shares when full integration of CIT and PIT was imposed, however, would not entirely restore equity. A large increase in stock values will occur when a firm experiences an increase in expected future rents (due to innovation, world price shocks, or whatever). By the same token, a large drop in stock prices could occur under the opposite circumstances. This capital gain represents income over and above any retained earnings during the tax year and should therefore be taxed.[29] Hence what is ideally required under the UIT reform is a system where accrued capital gains are included in income and a credit is allowed for

CIT paid on retained earnings (which may be greater or less than accrued capital gains).

Another problem with full integration of CIT and PIT is that it would greatly reduce the extent to which tax preferences can be used to affect corporate behaviour. (Some might view this as an advantage.) Given corporate profits and the taxpayer's personal tax bracket, the introduction of a corporate tax expenditure – for example, investment tax credit or employment tax credit – will make no difference to the shareholder's increased tax liability as a result of share ownership. This would clearly not be the case if the CIT preferences were explicitly allowed as a deduction from corporate profit in determining an individual's share of corporate profit. However, this would of course violate equity, from the Haig-Simons viewpoint.

The final major issue with respect to CIT under the UIT reform is inflation proofing. This has three major components: inflation-adjusted accounting for depreciation, capital gains on inventory, and interest expense.

Depreciation

In the absence of offsetting measures, in a period of inflation, historical-cost-based depreciation leads to an overstatement of net profit, since depreciation is reckoned in acquisition date, instead of current, dollars. This can easily be corrected. At present any corporation (or unincorporated business in the PIT case) carries forward from one year to the next an accumulated total of depreciable assets in a number of different categories. Inflation proofing would require only that last year's total be adjusted upwards by last year's official rate of inflation before the capital cost allowance is computed in the current tax year.

Inventories

Materials used in current production are costed in Canada according to the first-in, first-out (FIFO) convention. In other words, goods withdrawn from inventory today are costed at the prices originally paid for the oldest goods of the same type still in inventory. Since goods withdrawn from inventory must be replaced at current prices, this amounts to taxation of nominal capital gains on inventories. Again a simple remedy is available – replacement cost accounting for inputs.

Interest Expense

As has already been mentioned several times in this study, allowing full deductibility of nominal interest during a period of inflation is overgenerous. Only the real component should be deductible. Thus from nominal interest paid out, a firm should have to deduct the authorized rate of inflation times outstanding debt. (Fluctuations in debt over the year cause some difficulty, but with modern data-processing methods, the additional cost of adding up the benefit from inflation in terms of erosion of the real value of debt on a day-by-day basis is not large.)

In conclusion, the impression sometimes created that there are great difficulties in moving to inflation-proofed accounting methods appears to us somewhat exaggerated. The accounting practices required are far more straightforward than the complex changes required, for example, to tax real investment income on an accrual basis under the PIT. Nevertheless, in a comparison between CT and UIT approaches, it must be counted as a disadvantage of the latter that the extra cost of inflation-proofed accounting must be borne.

Conclusion

We have seen in this chapter that it is important to distinguish the motivation for alternative tax reforms. If the goal is to achieve equity among taxpayers over periods of time in the order of a lifetime, there can be little disagreement that the ideal tax base is lifetime consumption (although there may be disagreement as to whether bequests are part of this tax base). On the other hand, if the goal is primarily to achieve efficiency, with equity in the background as a subsidiary target, and distortions of saving and investment behaviour are considered particularly serious, then almost any tax change that reduces the burden on capital income may be viewed as desirable. Whether the tax base approximates lifetime consumption (with or without bequests) may be viewed as uninteresting.

It is also important to keep in mind the practical constraints on tax reform. These are embodied in administrative and compliance costs but also in public attitudes. There is little use in recommending tax reform that is prohibitively costly or nonimplementable by politicians in any reasonable scenario. In the last section we saw that these considerations favour highly the lifetime CT approach over the strict UIT approach. There is hardly any significant move from the current tax system in the direction of uniform income tax that can be characterized as easily achieved. Some of the most highly prized reforms under this approach – for example, taxing investment income on a real accrual basis and taxing imputed rent on owner-occupied houses – are liable to entail very large administrative and compliance costs and to be politically unappealing.

Summary

This chapter has defined the major tax reform options: a lifetime consumption tax approach owing its basic design to the famous report of the U.S. Treasury (1977), and a uniform income tax approach similar to that advocated by the Carter Commission in the 1960s. We have argued that there is more agreement between the proponents of these alternative schemes on fundamental equity considerations than is generally appreciated. Problems encountered in using either approach as a reform guideline were also examined. In our view, the UIT approach is largely nonimplementable due, for example, to the difficulties of taxing imputed rent and real accruing capital gains and business income. In contrast, the current Canadian personal income tax system already displays many of the features of a Blueprints-style consumption tax – for example, registered savings plans. There are no major administrative barriers to full adoption of a consumption tax design in personal taxation. Finally, we have discussed the relationship between personal and other taxes. For example, it has been pointed out that a broadly based retail sales tax or value-added tax and a stand-alone cash-flow corporate tax would complement a personal consumption tax. A tax falling on real income at the corporate level and fully integrated with the personal income tax would be required under the UIT approach.

4 Efficiency Aspects of Capital Income Taxation

There has been a great deal of theoretical and applied work on the efficiency aspects of capital taxes. This has proceeded at varying levels of analytical sophistication. Alternative studies are distinguished as much by the type of analytical tools employed as by the phenomena actually studied. Thus, initially, all the work in this area was partial equilibrium in nature and applied to a single period – that is, it was "static." With the work of Harberger in the early 1960s on the welfare costs of CIT, the first general equilibrium work appeared, but the analysis was still static. Later, in the 1970s, the intertemporal distortions caused by capital income taxation were examined. This work, which reached its fullest development in Feldstein (1978), could be characterized as "dynamic," but it neglected induced changes in factor prices and was, therefore, partial equilibrium in nature. Most recently, attention has focused on a range of dynamic general equilibrium studies – some examining one-sector economies without static distortions of resource allocation (Summers, 1981; Auerbach et al., 1983), and some incorporating sectoral detail and, therefore, addressing static as well as dynamic distortions (Fullerton et al., 1983; Ballard, 1983).

This chapter examines efficiency aspects of capital income taxation at the static partial equilibrium, static general equilibrium, dynamic partial equilibrium, and dynamic general equilibrium levels of analysis successively.

Static Partial Equilibrium Analysis – Labour/Leisure Choice

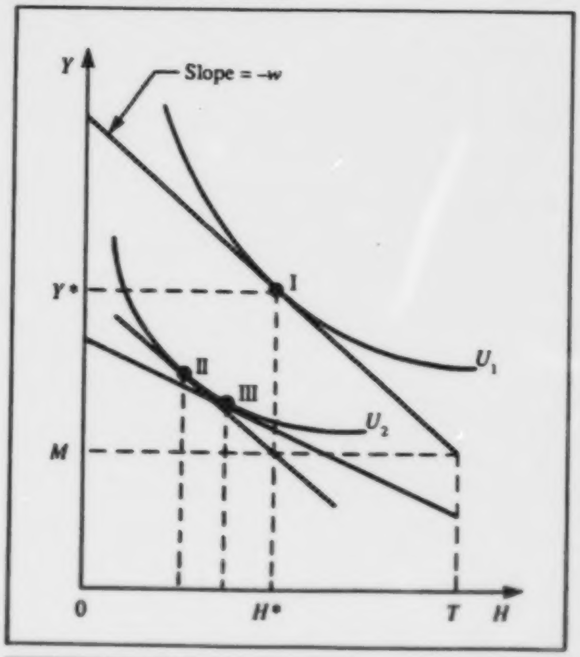
One efficiency aspect of capital income taxation that can be usefully addressed at this level of analysis concerns distortions of labour/leisure choice. The conventional model of labour/leisure choice considers an isolated individual who consumes all of his/her income in a single period, and who chooses freely hours of work at a constant wage rate, w. Utility depends on the consumption of leisure time, H, as well as of a homogeneous consumption good. There is an endowment of time, T, so that the individual supplies $L = T - H$ hours to the labour market. There may be an endowment of nonlabour income, M. Income, Y, is given by $Y = wL + M$ and is expended fully on consumption, so that we may view utility as depending on H and Y. The simple problem of consumer choice this poses is illustrated in Figure 4-1.

In the no-tax case, the consumer faces a budget constraint with a slope equal to $-w$ (giving up another hour of leisure produces an increase in Y of w) and selects leisure time H^*, implying labour supply $L^* = T - H^*$. The imposition of a proportional income tax at rate t gives $Y = (1 - t)(wL + M)$, so that the income that can be consumed at zero hours of work declines from M to $(1 - t)M$, and the slope of the budget constraint changes to $-(1 - t)w$.

The effect of the income tax on labour supply, contrary to common belief, is indeterminate. This can be shown by decomposing the total effect into its "income" and "substitution" components. A decline in real income sufficient to reduce utility from its initial level (U_1) to the post-tax level (U_2) without altering the wage rate would move consumption to point II in Figure 4-1. As

Figure 4-1

Effects of a Proportional Income Tax on Labour/Leisure Choice



drawn, and as usually assumed, leisure is a normal good, so that this loss of real income would induce a decline in the demand for leisure and an increase in hours of work. This effect is neglected in the popular wisdom regarding incentive effects (e.g., in "Reaganomics"). It is offset by the substitution effect, here illustrated by the movement from points II to III, producing a decline in the consumption of "income" and an increase in leisure time.[1]

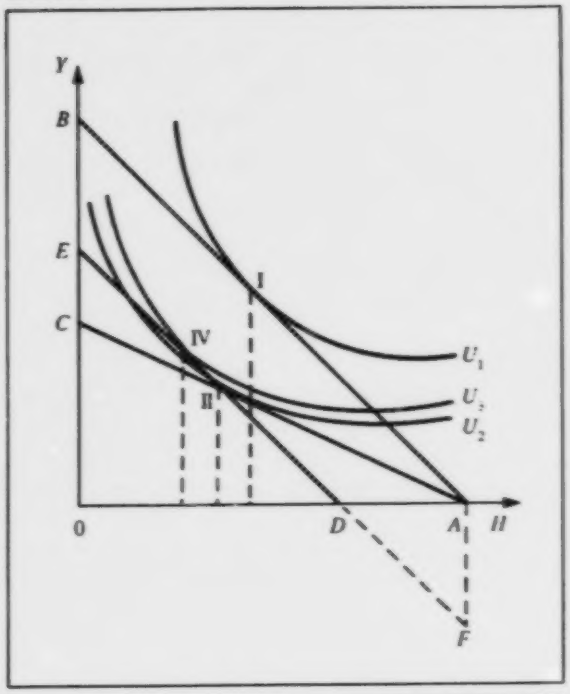
A considerable amount of empirical work has been done on the impact of changes in wage rates on labour supply. In principle this ought to help us predict the impact of taxation, since the effect of a decline in the after-tax wage, $(1 - t)w$, should not depend on whether it is due to a movement in t or w (neglecting that when t changes, so does after-tax nonlabour income). The stylized results of this literature are that for "prime-age" male workers (aged 25-54) the income effect is slightly stronger than the substitution effect, so that the typical response to an increase in the tax rate (or a decline in the wage rate) is an *increase* in hours worked. On the other hand, for married women the opposite has been found. The substitution effect greatly outweighs the income effect, and the response to a higher wage is increased likelihood of labour force participation and hours worked. The overall effect on aggregate labour supply is positive but small: on the basis of the surveys of Lewis (1975) and Borjas and Heckman (1979), Fullerton et al. (1983) suggest that the aggregate uncompensated elasticity of labour supply with respect to the wage rate is likely about 0.15.[2]

It is sometimes supposed that if the incentive effects of taxation are slight, so must be the welfare effects. Thus if, for example, tax increases leave labour supply or saving unchanged, then distortions are negligible. This is incorrect. While there would be no welfare effects if substitution effects were zero, in the presence of income effects zero responses in labour supply or saving do not indicate zero substitution effects.

Figure 4-2 illustrates the welfare analysis of a tax affecting labour/leisure choice.[3] For simplicity, zero nonlabour income is assumed. The proportional income tax rotates the budget constraint from AB to AC, moving the optimal consumption bundle from point I to point II. Note that the vertical distance between the budget constraints AB and AC above point II is the loss of income suffered by the consumer due to the tax. An equal-yield lump-sum tax is, therefore, one that produces a budget constraint passing through point II with slope $-w$. This budget constraint is given by DE (or EF if we wish to extend the lump-sum budget constraint below the axis to see how it could be obtained by reducing the consumer's after-tax nonlabour income by the amount AF).

Figure 4-2

Welfare Effects of a Proportional Income Tax, with Labour/Leisure Choice



Clearly, the consumer can do better with the equal-yield lump-sum budget constraint than with the proportional income tax. The U_3 level of utility can be achieved, which represents an improvement over U_2. In fact, given that tax revenue AF *must* be extracted from this consumer, there is no way of doing so which is superior to the lump-sum tax illustrated. The utility loss $U_1 - U_3$ may, therefore, be thought of as the *necessary* burden of taxation in this context. The actual burden, $U_1 - U_2$, is larger by the amount $U_3 - U_2$, which is referred to as the "excess burden" of the tax. Cash measures of the difference in real income between points IV and II are available to quantify the excess burden. These include the equivalent variation, which is the amount of nonlabour income that would have to be taken away from a consumer subject to the lump-sum tax to produce a loss in utility *equivalent* to that involved in moving from IV to II, and the compensating variation, which is the amount of nonlabour income that would have to be given to a consumer subject to income tax to increase utility sufficiently to *compensate* him/her for moving from IV to II.

As long as leisure is a normal good, a lump-sum tax (e.g., a tax on nonlabour income) would always produce a decline in leisure time and an increase in hours worked. This helps to explain why a lack of change in labour supply in response to a tax increase is not evidence of zero distortion. A nondistortionary tax would *increase* labour supply. The distortion consists in the inducement to consumers to take too much leisure relative to what they would take under a lump-sum tax. Thus, rather than implying an absence of distortion, if leisure is a normal good, invariance of labour supply with respect to changes in the income tax rate indicates that there *is* distortion, that is, a positive excess burden of the tax.

It is not difficult to see the determinants of excess burden. Clearly, a higher tax rate makes for a larger burden. In addition, the elasticity of substitution between leisure and income is crucial. If this elasticity were zero, producing rectangular, "Leontief" indifference curves, there would be no substitution effects, and points IV and II would correspond in Figure 4-2. (Point II would correspond to the vertex of the highest Leontief indifference curve intersecting both *AC* and the equal-yield lump-sum tax budget constraint, *DE*.) The greater is the elasticity of substitution, the more widely separated are points II and IV in the diagram, and the greater is excess burden. There are no direct estimates of the relevant elasticity. However, simulation studies indicate a fairly substantial value may be realistic. Fullerton et al. (1983) found that an elasticity of substitution between the goods composite and leisure in a nested CES utility function must be about 0.5 to give an aggregate uncompensated labour supply elasticity of 0.15. Auerbach et al. (1983) found that an elasticity of substitution of 0.8 was required in their model to produce aggregate responsiveness consistent with their reading of the empirical evidence.

How does the above relate to issues of capital income taxation? Alternative treatments of capital income lead to different degrees of distortion in the labour/leisure choice. Starting from our current tax system, which we have seen taxes much capital income more lightly than labour income, the adoption of a uniform income tax would broaden the tax base, allowing a general reduction in tax rates, including those impinging on labour income. This would imply a *reduction* in the current labour/leisure distortion. On the other hand, in a move to a wage tax (WT) or expenditure tax (ET), the remaining taxation of capital income would be removed, so that tax rates would generally increase. Thus, WT or ET reform would *worsen* the labour/leisure distortion at the same time that it eliminated the intertemporal distortion.

The implication of all this is that while at one time it was believed that WT or ET reform was unambiguously superior to UIT on efficiency grounds, that belief was based on the implicit assumption of fixed labour supply. Once labour/leisure choice is allowed, it is not clear that WT or ET dominates UIT on the efficiency front.[4] Since many prefer UIT to WT or ET on equity grounds, this is a serious problem for consumption tax advocates.

Finally, note that taking labour/leisure choice into account does not exhaust the refinements to the welfare analysis of capital income taxation that need to be performed on the labour or human resources side. As we detail in Chapter 6, UIT distorts human capital investment, as well as saving and investment in "physical" form. This is not true under WT or ET. One recent study finds that this is quantitatively more important than the labour/leisure distortion (Driffill and Rosen, 1983). Hence a full treatment of efficiency effects on the labour or human resources side may reinforce that case for consumption tax reform, rather than detract from it.

Static General Equilibrium Analysis – Sector-Specific Factor Taxes

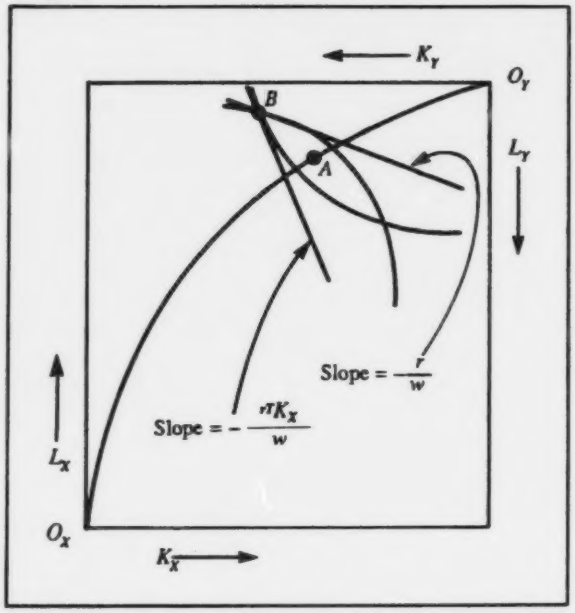
At this next level of analysis, a very different set of issues can be examined than with static partial equilibrium analysis. In a series of papers in the late 1950s and early 1960s, Arnold Harberger used a particular type of static general equilibrium analysis to examine the distortionary effects of CIT in the United States on the allocation of capital and labour between the corporate and noncorporate sectors.[5] This assumed fixed aggregate stocks of capital and labour but perfect mobility of capital and labour between sectors. (Note the combination of short-run and long-run features.) The corporate tax was modeled as a proportional tax on capital income in the corporate sector, which was taken to include all nonfinancial industries in the United States aside from agriculture, real estate, and some smaller industries where the noncorporate form of organization dominated.

The essential nature of the distortion examined by Harberger can be studied with the help of Figure 4-3. This presents an Edgeworth-Bowley box in which the horizontal axis displays the division of capital, *K*, between sectors *X* and *Y* (K_X and K_Y, respectively), and the vertical axis plots the division of the aggregate stock of labour, *L*, between *X* and *Y* (L_X and L_Y, respectively). As in Harberger's notation, *X* represents the corporate sector and *Y*, the noncorporate sector.

When Harberger examined the data for the United States in the late 1950s, he found that the corporate sector was strongly *labour* intensive relative to the noncorporate sector. (This is not surprising given the mechanization in

Figure 4-3

Effects of a Sector-Specific Tax on Capital



U.S. agriculture and the insignificance of labour relative to capital in real estate.) This explains the concave shape of the contract curve in the Edgeworth-Bowley box: for any efficient division of capital and labour between the two sectors, the ratio L_X/K_X is greater than L_Y/K_Y.

The Edgeworth-Bowley box is filled with families of *X* and *Y* isoquants. Their points of tangency determine the contract curve or set of efficient production plans. Reading off *X* and *Y* outputs along the contract curve, society's production possibility curve could be obtained. In the absence of distortionary factor taxes we would be assured of production on the contract curve (and therefore on society's production possibility frontier). To see this, note that in each sector the capital/labour input point lies on an isoquant tangent to an isocost line, the slope of the latter equalling $-r/w$ (the factor price ratio). Now, if the only factor taxes present were general – that is, levied on *all* capital or *all* labour (or indeed both capital and labour) at the same time – the tax-inclusive factor price ratio would be the same in both sectors. Thus, equilibrium would have to be at some point on the contract curve, since it is only on this curve that slopes of both *X* and *Y* isoquants are the same.

If a tax is levied on a factor used in only one sector, for example, in Harberger's case CIT constitutes a tax on capital in the corporate (*X*) sector, we are forced off the contract curve. If the tax-inclusive price of capital in sector *X* is now $^{rT}K_X$, in equilibrium the *X* isoquant has a higher slope (in absolute value) than the *Y* isoquant, since the after-tax capital/labour factor price ratio is higher in *X* than in *Y*. Thus equilibrium occurs at a point like *B* in Figure 4-3, rather than at a point like *A* on the contract curve. It is obvious that this is inefficient. Production of *both X* and *Y* can be increased by moving from the factor allocation shown by point *B* to that given by a point like *A*.

While the Edgeworth-Bowley box diagram conveniently illustrates the economic effects of a sector-specific factor tax, it does not suggest an immediate measure of excess burden. In fact, although Harberger used his GE model to develop a local approximation to the factor reallocations and changes in outputs resulting from CIT, he did not use the two-sector GE model to quantify welfare costs. Instead he used the partial equilibrium analysis illustrated in Figure 4-4.

Figure 4-4 shows in two parts the allocation of capital between *X* and *Y*, and the value of marginal product of capital (VMP_K) schedules in the two sectors contingent on an initial general equilibrium, with its associated allocation of labour between the sectors and market prices for *X* and *Y*. The use of capital in the corporate sector, K_X, is measured to the left of the vertical axis, while K_Y is measured to the right. The *VMP* curves are shown as linear, which is inoffensive in the context of small changes in the tax rate and the allocation of capital.

The initial allocation of capital in Figure 4-4 has *OA* units of capital in sector *X* and *OI* units in *Y*. The *VMP* (and, of course, the price of capital services, *r*) is the same in both sectors at *OG*. The imposition of a tax puts a wedge between the price of capital in *Y*, which continues to be denoted *r*, and the price in *X*, $^{rT}K_X$. The former is shown by *OF*, the latter by *OH*. The result of the increase in the price of capital in sector *X* is a movement of capital to sector *Y*. This movement depresses the after-tax price of capital, *r*, since declining marginal productivity of capital in *Y* means that more capital can be absorbed there only if the price of capital services declines. At the same time, the increase in the price of capital services to producers in the *X* sector means that the *VMP* of capital in *X* increases. Note, finally, that the loss of capital in *X* equals the gain in *Y*, so that the distances *AC* and *IL* are the same.

Using the elasticities of demand for capital in the *X* and *Y* sectors implied in his parameterization of the two-sector GE model, and the response of capital allocation to the tax rate implied by that model, Harberger plotted a

Figure 4-4

Welfare Effects of the Corporate Income Tax – Harberger's Analysis

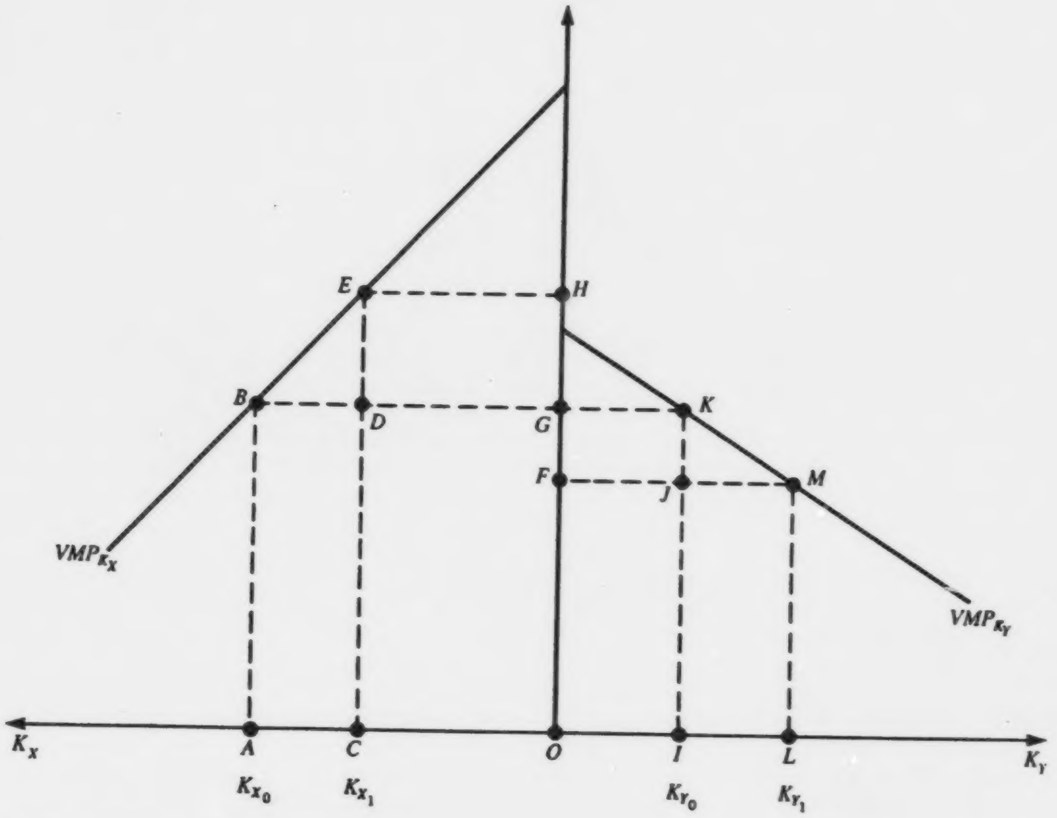


diagram like that shown in Figure 4-4 and calculated the net welfare consequences by "adding triangles." The movement of capital from *X* to *Y* produces a reduction in consumer surplus in *X* equal to *ABEC* and an increase in *Y* equal to *IKML*. The difference, which is an approximation to an ideal measure of the welfare loss associated with this reallocation of capital, is clearly the sum of the triangles *BED* and *JKM*. Extending this local approximation technique, strictly appropriate only for a small tax, to the U.S. CIT, Harberger estimated a welfare loss equal to about 0.5 per cent of GNP.

Harberger's use of a partial equilibrium device to calculate welfare costs, although parameterized by reference to his explicit two-sector GE model, represented a reversion to a less sophisticated level of analysis. It was not until Shoven and Whalley (1972) repeated Harberger's exercise with explicit computation and comparison of the distortionary equilibrium with a large CIT and an alternative nondistortionary equilibrium that this deficiency was corrected. The result was a vindication of Harberger's local approximation and partial equilibrium triangle adding. Shoven and Whalley's simulation put lower and upper bounds on the change in GNP caused by CIT in a model corresponding to Harberger straddling his numbers (p. 307).[6]

In the years since Shoven and Whalley's initial use of GE computations to examine the static welfare loss associated with CIT in the United States, there has been considerable further work along these lines. Industries have been finely disaggregated, factor taxes other than

CIT (property taxes, payroll taxes, business income taxes, etc.) and taxes other than factor taxes have all been introduced in an attempt to gain greater realism. The effect has been to confirm Harberger's initial estimate. Fullerton et al. (1981) estimate, for example, that the static welfare loss from nonintegration of CIT and PIT in the United States as of 1973 was $6 billion. This is about 0.5 per cent of the 1973 GNP of $1.3 trillion.

Finally, despite the confirmation of Harberger's results by later applied general equilibrium analysts, there is far from a consensus on the welfare impact of CIT. Gordon (1985*a*), for example, points out that this literature may be misleading due to its neglect of uncertainty. He shows that, under some conditions, the role of CIT in allowing the government to share risks with investors may result in effective neutrality: CIT may have no investment or saving disincentive effect. While it is beyond the scope of our study to explore this interesting argument, it clearly should be kept in mind in interpreting the results of research that ignores uncertainty.

Dynamic Partial Equilibrium Analysis

So far we have not examined intertemporal distortions caused by the taxation of investment income. The easiest framework in which to begin to deal with this complex set of issues is dynamic partial equilibrium analysis. At this level of analysis the impact of taxation on savers who live for more than one period, and plan on the basis of expected future developments as well as current variables, is modeled, ignoring the possible impact of changes in saving on factor prices. Thus we can ask, for example, what is the excess burden of a capital income tax when real wages and the pre-tax rate of return are constant (or, in the case of wages, increasing at a constant percentage rate). This type of analysis, of course, neglects the possibly very important welfare loss that may be caused when an increase in capital income taxes shunts the economy towards a growth path with a lower equilibrium capital stock. Such losses are examined in the next section, which looks at dynamic general equilibrium analysis.

This section considers in turn two period models of saving behaviour with: 1) fixed labour supply in the first period and complete retirement in the second; 2) fixed labour supply in both periods with semi-retirement; 3) endogenous labour supply in the first period and retirement in the second; and 4) endogenous labour supply in both periods. Partial equilibrium analysis can also be extended to make human capital investment endogenous. This extension is considered in Chapter 6.

Fixed Labour Supply with Retirement

The simplest dynamic partial equilibrium analysis of saving is the two-period model of strict life-cycle saving, where the first period involves fixed positive labour supply (and therefore fixed earnings), and the second period is one of complete retirement. This model has been explored, for example, by Feldstein (1978), Boskin (1978), and others.[7]

$$C_2 = (1 + r)S_1, \qquad (4.1)$$

which implies that:

$$S_1 = \frac{C_2}{(1 + r)} = pC_2, \qquad (4.2)$$

where $p = 1/(1 + r)$ is the price of second-period consumption. Since second-period *dissaving* equals S_1, aggregate steady-state saving will only be positive if there is earnings or population growth. Note also that, given rates of earnings and population growth, aggregate steady-state saving is proportional to S_1, so that we may discuss tax effects "on saving" by examining only changes in S_1 without loss of generality.[8]

The imposition of an interest income tax starting from the no-tax case is analytically the same as a reduction in r. Either produces an increase in the price of second-period consumption which is now:

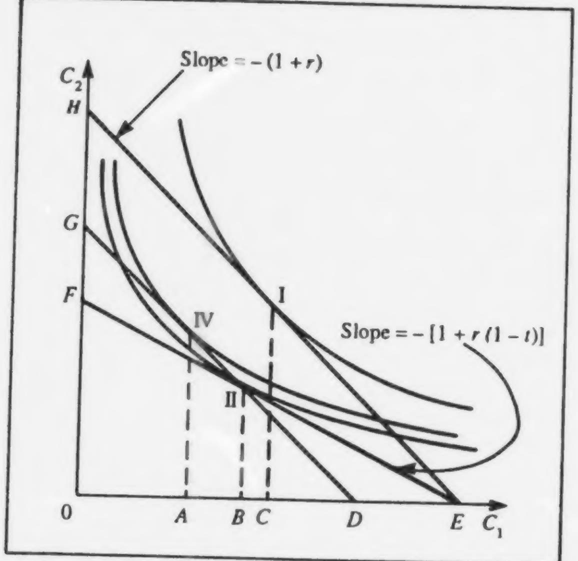
$$p = \frac{1}{1 + r(1 - t)}, \qquad (4.3)$$

where t is the proportional rate of interest income tax. The increase in p rotates the budget constraint around point E in Figure 4-5, producing the new budget constraint EF. The consumer chooses the optimum indicated by point II, rather than the former point I, now inaccessible.

As in the labour/leisure case, where neglect of the income effect leads many to expect that labour supply must decline in response to an increase in tax rates on earnings, here it is popularly believed that saving will unambiguously decline in response to the imposition of an interest income tax. Actually this need not occur – as illustrated in the diagram, where current consumption after the tax is imposed declines, meaning that current saving must increase. (First-period earnings are unaffected, and all taxes are paid in the second period, so that disposable income is unchanged in the first period.) The substitution effect, which leads to an increase in C_1, is opposed by the income effect, which, as long as C_1 is a normal good, leads to a decline in C_1.

Figure 4-5

Tax Effects on Saving, with Retirement



It is not hard to show that if preferences over C_1 and C_2 are homothetic, the income and substitution effects here will cancel perfectly if the elasticity of substitution between C_1 and C_2 equals unity. In other words, an interest income tax produces no change in saving in the Cobb-Douglas case. Since unitary elasticity of substitution seems *a priori* plausible to many, the conclusion drawn from this analysis (as pointed out, for example, by Summers, 1981) has commonly been that there is likely zero impact of an interest income tax on saving. As discussed below, Summers has argued cogently that this conclusion is unwarranted, since the simple two-period version of the life-cycle model ignores the "human-wealth effect."

As in the case of labour/leisure choice, even if the analysis suggests a zero impact of taxation on the behavioural variable of interest – now saving rather than labour supply – excess burdens are not zero. The size of the excess burden, as before, depends crucially, instead, on the tax rate and the degree of elasticity of substitution. While the current popular wisdom is that intertemporal elasticities of substitution are small – perhaps as low as 0.25 or 0.5 – several studies discussed below indicate that the excess burden is likely non-negligible.

Finally, Figure 4-5 can be used to examine the impact of alternative lump-sum taxes on saving. An equal-yield lump-sum tax must clearly produce a budget constraint that passes through point II and is parallel to the no-tax budget constraint, *EH*. The optimum is now at point IV, so that lump-sum taxation unambiguously produces greater future consumption and less current consumption than the interest income tax. However, the effect on saving depends on the form of the lump-sum tax. If all taxes continued to be paid in the second period, the reduction in C_1 would imply increased private saving (since earnings would still be at E_1 and no taxes would be paid in the first period). However, under either of the two usual ways of accomplishing lump-sum taxation here, some tax will now be paid in the first period. Under a proportional consumption tax, for example, an amount $t_C C_1$ would now be subtracted from disposable income in the first period, which was previously not taken away. Whether S_1 in fact rises depends simply on whether this new first-period tax exceeds the decline in C_1 in the movement to the lump-sum tax. Interestingly, with homothetic preferences the drop in C_1 is matched precisely by the increase in tax, so that saving is unaffected by a proportional consumption tax. A proportional earnings tax, levied at the rate required to obtain the budget constraint *DG*, will produce less private saving than the true consumption tax. The reason is that *all* of the tax revenue will now be collected in the first period. Thus first-period disposable income is lower than in the consumption tax case, but consumption, C_1, is at the same level. Thus S_1 must be lower under the proportional earnings tax.

The fact that private saving must be lower[9] in a life-cycle model of saving under an earnings tax than under an equal present-value yield expenditure tax is a very general result. As long as earnings occur, on average, earlier than consumption over the lifetime, a move from a strict consumption base to a pure earnings base results in a decline in private saving. This decline may, or may not, be offset by an increase in government saving, for example, via a reduction in the national debt. In any case, it provides an important qualification to the "equivalence" in the Blueprints approach to consumption tax reform of registered and tax-prepaid (nonregistered) treatment of assets.

As explained in Chapter 3, registered treatment corresponds to pure consumption tax treatment and nonregistered treatment, to earnings taxation. Thus, in light of the above discussion, although the present value of tax liabilities is not affected by the taxpayer's choice between these alternatives, this choice is not neutral with respect to private saving. As we shall see in the next section, this phenomenon is important, since in closed-economy dynamic general equilibrium models a decline in saving can remove much of the welfare gains of movement to a consumption tax. Unless government runs an offsetting debt policy, the virtue of the registered-nonregistered system on the efficiency front may therefore depend on the extent to which registered rather than nonregistered treatment applies.

A final note on the distinction between true consumption and earnings taxes is that, because taxes are paid earlier under the earnings tax approach, undiscounted tax payments are smaller than in the consumption tax case. This implies that although the present value of taxes over any taxpayer's lifetime will be the same in the two cases, aggregate tax collections will be smaller in the earnings tax case. (With zero population or earnings growth, for example, aggregate tax collections are proportional to the undiscounted sum of tax payments over the lifetime of the representative taxpayer.) This has important implications. For example, in order to satisfy a given government revenue requirement in the steady state, tax rates must be higher under the earnings tax than under the consumption tax; that is, the present value of tax burdens must actually be higher under the earnings tax. This immediately implies that the steady-state utility of the representative taxpayer would be lower under an earnings tax, given a particular revenue requirement, even if capital intensity of production were the same under both tax regimes.

Although consumption and wage taxes have different impacts on saving, they are both effectively lump-sum taxes in the present context since labour supply is exogenous. Thus either can be used as the reference point to evaluate the excess burden of capital income tax. Boskin (1978) and Feldstein (1978) compute the welfare cost of a 50 and 40 per cent tax on capital income, respectively, using the local approximation welfare triangle approach. Assuming a zero uncompensated elasticity of saving with respect to the after-tax interest rate, Feldstein estimates a welfare loss equal to about 20 per cent of first-period saving (p. 45). Using a slightly higher tax rate, and his estimate of the uncompensated elasticity of saving with respect to the after-tax interest rate (0.4) as a lower-bound estimate on the compensated elasticity, Boskin obtains a welfare loss from capital income tax equal to about 25 per cent of first-period saving (p. 19). These losses appear to translate into at least 2 per cent of GNP.[10]

Fixed Labour Supply with Semi-Retirement

The relaxation of complete retirement in the second period of a two-period saving model allows the introduction of the important human-wealth effect initially explored by Summers (1981). Labour supply remains exogenous, and for simplicity it will be assumed that the wage rate is the same in both periods. For realism it is best to think of the bulk of earnings occurring in the first period, so that the second period is one of semi-retirement.

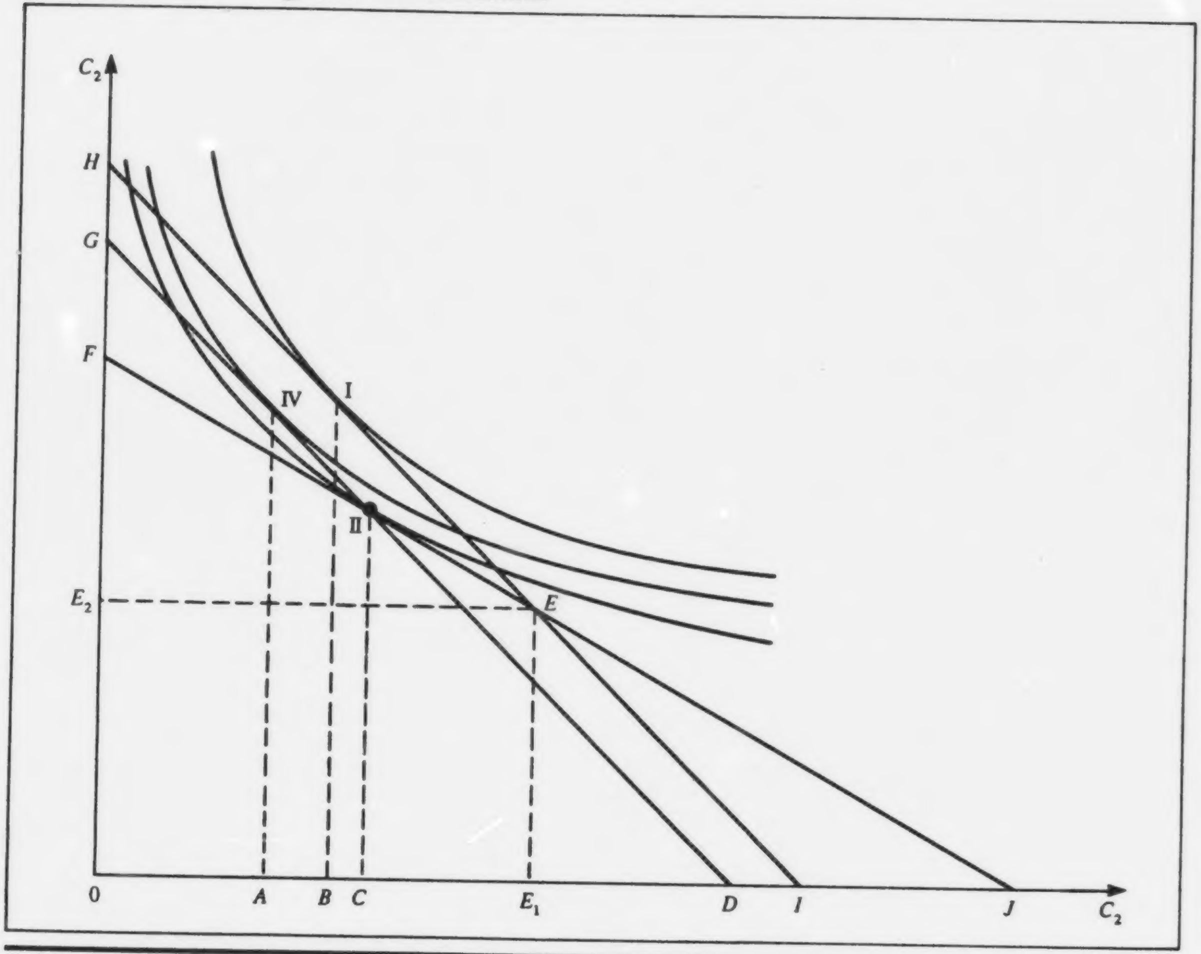
Figure 4-6 sets out the new case diagrammatically. It differs from Figure 4-5 in allowing $E_2 > 0$. This moves endowment point, E, into the interior of the diagram. The imposition of an interest income tax again changes the slope of the budget constraint to $-[1 + r(1 - t)]$, but with rotation occurring around the interior point E, the new budget constraint does not intersect the horizontal axis at the same point as in the no-tax case. In fact, this point of intersection moves to the right, so that there is a positive income displacement that was not present when the second period was one of retirement. This positive displacement is due to an increase in the discounted value of E_2 caused by the decline in the relevant discount rate, that is, the after-tax rate of return $r(1 - t)$. This rightward displacement of the budget constraint (before tax) corresponds to Summers' human-wealth effect.

If consumption in the first period is a normal good, the human-wealth effect acts to increase C_1. That is, this effect *reinforces* the substitution effect of an increase in interest income tax. Both tend to increase current consumption and reduce current saving. As pointed out above, in the apparently plausible Cobb-Douglas case, in the absence of the human-wealth effect one would expect no impact of changes in interest income tax on private saving. However, once the human-wealth effect is taken into account, the Cobb-Douglas case becomes one in which saving declines unambiguously in response to an increase in interest income tax. When closed-economy general equilibrium effects are considered, as in the next section, this means that a two-period life-cycle model will give a larger welfare cost of capital income tax (if aggregate private saving is socially suboptimal) with semi-retirement than with complete retirement.

It should be noted that although the two-period framework allows the human-wealth effect to be exposited diagrammatically, it does not give a correct impression of the likely strength of this effect. Although, on average, if adult life were to be divided into two periods of equal length, the second period would display significant earnings, the bulk of earnings come in the first period in any realistic case. Thus, the increase in human wealth due to the decline in the discount rate is restricted in the two-period formulation. (First-period earnings are not discounted.) In the real world the reverse is true. The portion of earnings that will be received so soon that it need not be discounted at all is negligible. The entire earnings stream is in the future, and all components (except this week's or this month's depending on the

Figure 4-6

Tax Effects on Saving, without Retirement



relevant accounting period) will increase when the discount rate falls, although, as in the two-period case, the relative importance of later earnings accretions will increase with the lighter discounting. This means that, as Summers found, typically the human-wealth effect will lead to a very sizable augmentation of resources.

Endogenous Labour Supply with Retirement

While the two-period saving model with fixed labour supply is simple and instructive, it is less interesting than a model that makes labour supply endogenous, since under exogenous labour supply ET and WT reforms *must* represent an improvement in efficiency terms, since they remove the only distortion – that is, the intertemporal. When labour supply is endogenous, an income tax also distorts labour/leisure choice, and, as explained earlier, ET and WT reforms worsen this distortion since they necessitate an increase in tax rates. (Wages or consumption provide smaller aggregate tax bases than income.)

With labour supply possible only in the first period, as shown by Atkinson and Stiglitz (1976), if utility were separable in leisure and consumption, then levying a tax only on consumption or on wages would be optimal if leisure could not be taxed. It only makes sense to tax consumption in different periods at different rates (as under an income tax, which affects the relative price of future consumption) if the degree of substitutability between leisure and consumption differs by the period of consumption. If consumption in retirement were complementary with leisure during the working years (that is, more complementary than consumption in working years), then it would be optimal to tax retirement consumption more heavily, as under the income tax. Intuitively, placing a heavier tax on a commodity (retirement consumption) complementary with the untaxed commodity (leisure) induces the consumer to reduce his/her consumption of the untaxed commodity. This is an improvement since, as discussed earlier, the consumer otherwise takes *too much* of the untaxed commodity.

While it seems unlikely that people's utility functions are in fact separable in first-period leisure and consumption, it also seems unlikely that retirement consumption is more complementary with leisure during the working period than consumption during the first period. Thus, although with endogenous first-period leisure consumption or wage taxes may not be *optimal*, they may well be superior to an income tax.

Feldstein (1978) examined the possible superiority of consumption or wage taxes to an income tax in the two-period model with endogenous first-period labour supply in a partial equilibrium setting. This represented a tour de force in the application of local approximation. It is important to note that, as was true in Harberger's calculations of welfare losses from the CIT, this approach imposes a limitation additional to that implied by the partial equilibrium framework. The extra limitation is that a local approximation only strictly valid for *small* changes in taxes is used to quantify welfare "triangles" involving very large changes.

Feldstein modeled the removal of capital income taxes in the United States (levied along with a labour income tax at a rate of 40 per cent) and their replacement by an equal present-value yield wage tax under the assumption that the uncompensated elasticities of saving and labour supply with respect to the interest rate, and of labour supply with respect to the wage rate, were all zero. (Many apparently believe this special case realistic.) In this case the differential welfare loss from capital income taxation is 1.9 per cent of wage income (p. 46). Since the latter is in the neighbourhood of, say, 75 per cent of national income, this corresponds roughly to a welfare loss equal to 1.5 per cent of national income.

Feldstein performed an additional exercise extending Harberger's partial equilibrium analysis of the distortion caused by corporate income tax. Viewing CIT as a surcharge of 20 per cent on capital income (producing a total tax rate of 60 per cent), Feldstein computed the welfare gain from replacing this extra tax by a uniform upward revision of the 40 per cent standard rate on labour and capital income sufficient to collect the same revenue. This welfare gain was approximately 0.5 per cent of GNP. Added to Harberger's 0.5 per cent of GNP welfare loss from the purely static misallocation of capital between corporate and noncorporate sectors, a total welfare loss from a nonintegrated CIT of about 1 per cent of GNP is implied.[11]

The bottom line from the most widely noted static analyses of the welfare losses from capital income taxation is therefore as shown below.

	Percentage of GNP
Welfare loss arising from:	
Static misallocation between corporate and noncorporate sectors (Harberger)	0.5
Distortion of saving due to corporate income tax over and above standard capital income tax (Feldstein)	0.5
Distortion of saving due to standard capital income tax (Feldstein)	1.5
Total	2.5

Opinions may clearly differ about the importance of a welfare loss estimated at 2.5 per cent of GNP. If this was the full extent of the efficiency loss from capital income taxation, it becomes difficult, however, to argue the case for ET or WT reform in the face of widespread fear that these types of reform would significantly reduce vertical equity.

Endogenous Labour Supply throughout Life

For completeness it is of some interest to review the results of one partial equilibrium study that compares the excess burdens of income and consumption taxes where there are many periods of life (55 adult years) in all of which labour supply is endogenous. The results of Driffill and Rosen (1983) suggest that a proportional income tax levied at a rate of 20 per cent would create an excess burden of about 2 per cent of GNP, in a case where the intertemporal elasticity of substitution, σ, is set at 0.5. Over 90 per cent of this excess burden would be removed by a switch to a proportional expenditure tax. Thus the welfare gain from ET reform appears to be just a little less than 2 per cent of GNP according to this study. This is in the same ball-park as Feldstein's estimate of a 1.5 per cent welfare gain. However, it should be noted that Driffill and Rosen assume an income tax rate just half that considered by Feldstein. Since, as Driffill and Rosen note (p. 678), excess burdens increase approximately with the square of the tax rate in their calculations, the Driffill and Rosen simulation would likely produce a gain from ET reform of at least 5 per cent with Feldstein's tax rates of 40 per cent. This is important since the Driffill and Rosen methodology is clearly superior to Feldstein's. (The welfare gains are computed by the comparison of alternative solutions of the model with different tax rates, rather than by the use of local approximations; lifetimes are broken down into 55 rather than 2 periods; realistic variation in wage rates and labour supply over the lifetime are allowed; and Summers' human-wealth effect is present.)

Dynamic General Equilibrium Models

One-Sector Models

As an introduction to dynamic general equilibrium analysis, consider the familiar one-sector neoclassical growth model. This model assumes a homogeneous labour supply provided by N workers who each embody l unit of effective labour power, producing a supply of labour $L = lN$. Population is assumed to grow at the constant rate n, while effective labour units per person grow at the rate g. Hence the growth rate of labour supply is at a constant rate of $n + g$.

It is also assumed that aggregate output is a function of aggregate capital and labour displaying constant returns to scale. Thus output, Y, can be expressed in per capita terms, $y = Y/L$, as a function of the capital/labour ratio, $k = K/L$:

$$y = f(k);\ y^{I} > 0,\ y^{II} < 0. \tag{4.4}$$

This simple concave production function is illustrated in Figure 4-7.

For "balanced growth" the capital/labour ratio and per capita output must be constant. Note that since these quantities standardize by the supply of effective labour units, in balanced growth the capital per person and output per person ratios grow at the rate of Harrod-neutral technical progress, g. For the capital/labour ratio to be constant, the aggregate capital stock must grow at the rate $n + g$. This requires that an amount $(n + g)k$ per effective labour unit must be saved. The required level of saving for balanced growth is shown in Figure 4-7 by the ray from the origin labeled $(n + g)k$.

The particular levels of k and y obtained depend on society's saving function. In the simplest growth models it is assumed, for example, that saving is proportional to income, so that per capita saving, s, would simply be a scaled-down version of the concave production function:

$$s = \theta f(k), \tag{4.5}$$

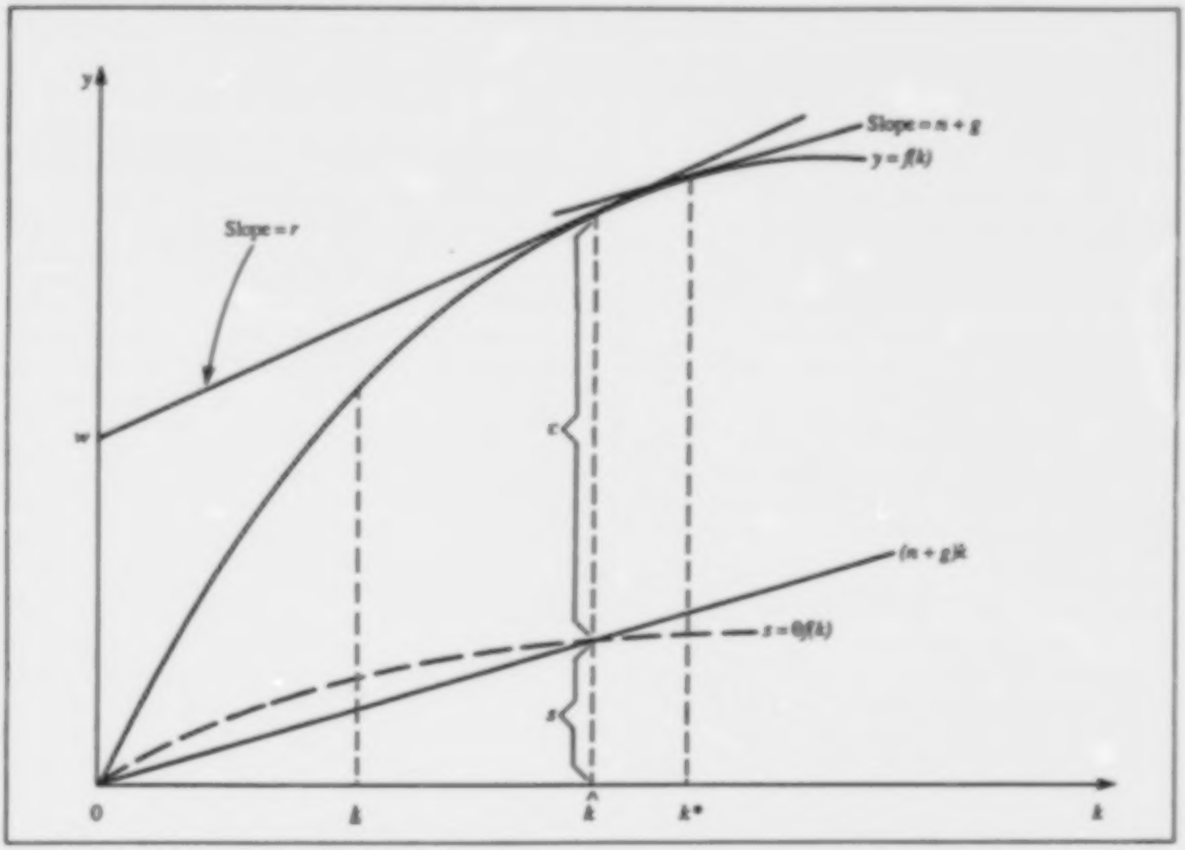
where θ is the propensity to save out of y. This produces a unique intersection of the saving function with the ray from the origin showing investment per capita required for balanced growth and determines a steady-state value of k, $\hat{k}$. Any saving function that is a concave function of k with initial slope greater than $n + g$ (and slope everywhere less than that of the production function) produces a qualitatively similar steady state.

As indicated in Figure 4-7, the slope of the production function at the steady-state k equals the marginal product of capital and, therefore, the rate of return, r. Since rk is the total return to capital $\hat{k}$, the wage rate (which given constant returns to scale together with the per capita income of capital adds up to output per capita) is given by the intercept of the line tangent to the production function at $\hat{k}$ with the vertical axis, as indicated in the diagram. Note that although the rate of return to capital is constant over time, since the wage rate is a payment per effective labour unit, the earnings of an individual worker grow over time at the rate g. Also note that on balanced-growth paths with greater capital intensity, the rate of return is unambiguously lower and the real wage higher.

Figure 4-7 also shows how national income is split between consumption, on the one hand, and investment and saving, on the other. (Note that in this closed-economy model saving must equal investment.) The vertical distance between the production and saving functions gives consumption per capita, c. Note that in general c will not be maximal at a steady state determined by an arbitrary saving propensity, θ. Maximal consumption occurs where the slope of the production function equals that of the balanced-growth required investment relation. Since the former slope equals r, and the latter $n + g$, the implication is that the economy is in the golden-rule steady state when $r = n + g$. On the basis of estimates of real rates of return in excess of 10 per cent in countries like the United States (Feldstein and Summers, 1979), it is widely believed that the advanced industrial countries are typically *below* the golden-rule steady state, since population and wage growth typically sum to, say, about 3 per cent.

Figure 4-7

One-Sector Neoclassical Growth Model



The disequilibrium behaviour of the model can easily be characterized. If, for some reason, the capital/labour ratio equalled $\underline{k}$ in some initial period, saving and investment would exceed that required to keep k constant, and $\hat{k}$ would tend to rise over time, so that the steady-state $\hat{k}$ would eventually be reached. Conversely, with an initial $k > \hat{k}$, the capital/labour ratio would decline until the steady-state value was reached. While the fraction of national income saved and invested would not change in either disequilibrium process, the rate of return would fall and real wages would rise at a rate above g during the approach to k from below, while the opposite would occur in an approach from above.

The above discussion illustrates properties of the neoclassical one-sector growth model that may have important implications for interpreting real-world growth processes. First, note that with a constant fraction of national income saved and invested we may have either a constant-growth rate (we begin and stay at $\hat{k}$), a temporarily high-growth rate followed by a decline to the rate g (we begin below $\hat{k}$), or a temporarily low-growth rate followed by an increase to g (we start at $k > \hat{k}$). Second, for societies in balanced growth with the same underlying rate of Harrod-neutral technical progress, the saving/investment propensities may be very different, but the growth rates will be the same. Thus the popular belief that the rate of capital formation is an important determinant of a country's growth rate is clearly wrong, from the point of view of the one-sector neoclassical growth model.

The only way in which a country's rate of capital formation may affect its growth rate is in disequilibrium.

An increase in the saving/investment propensity will lead to a rightward movement in the intersection between the saving function and balanced-growth investment function and, therefore, a rise in steady-state *k*. This will set off a temporary period of growth at a rate higher than *g* as output per capita rises to the new steady-state level. Similarly, a drop in the saving/investment propensity produces a period of temporarily slow growth. It is therefore only *changes* in a country's rate of capital formation that have an effect on growth rates. Permanent differences in rates of capital formation should have no such effect.

The discussion of disequilibrium adjustments in the one-sector neoclassical growth model clarifies the advisability of increasing the rate of capital formation in order to reach the golden-rule balanced-growth path. Referring again to Figure 4-7, if the government could engineer an increase in the saving propensity, θ, of the right magnitude, it could set the economy off on an adjustment path leading to the golden rule. This would increase steady-state consumption and welfare. However, it is not clear that the policy initiative would be warranted. For some time before the new steady state is reached, consumption per capita will actually be below what would have been experienced if the economy had proceeded along the old balanced-growth path. (The impact effect on consumption can be read off from the diagram from the upward shift of the saving function.) Thus, whether a move to the golden-rule steady state is considered desirable depends on the relative weight placed on the welfare losses to be experienced in the short run and the gains to be secured in the long run. These relative weights must embody concepts of intergenerational equity.

In recent tax policy literature, the one-sector neoclassical growth model has been adapted to consider an economy with life-cycle saving. The only difference this makes to the above analysis is that the saving function becomes more complex. It remains a concave function of the capital/labour ratio, however, so that the essential nature of the balanced-growth paths discussed to this point carries through.

Summers (1981) derives explicitly the aggregate saving function for a society in which individuals all work a constant exogenous number of hours per year for 40 years and then retire completely for 10 years. Each individual maximizes a utility function of the isoelastic form defined over consumption in the successive years of life. This implies an aggregate saving function of the general form:

$$s = \theta(r, \delta, \sigma, n, g, T, T') \cdot w, \qquad (4.6)$$

where δ is the rate of time preference; σ, the intertemporal elasticity of substitution in consumption; *T*, the length of adult life; and *T'*, retirement age. This function is considerably different from the simple neoclassical saving function. As Summers emphasizes there is now a *zero* propensity to save out of nonlabour income. Second, the savings propensity is variable. While the taste, growth rate, and timing parameters may be assumed exogenous, the rate of return, *r*, depends on the capital/labour ratio. Although the impact of *r* on θ is not unambiguous, in the case examined by Summers it was positive over a wide range of values for σ.

The results of Summers' simulations of the impact of abolishing capital income taxation and moving to a wage or consumption tax was a demonstration that for plausible values of σ (0.5 and 1) both of these reforms would considerably increase the capital/labour ratio and produce large gains in steady-state welfare. With a Cobb-Douglas production function and σ = 1, for example, the WT reform would increase the capital/labour ratio from 3.166 to 5.628 and produce a 13.1 per cent change in steady-state consumption, or a 4.9 per cent welfare gain as a percentage of lifetime income. ET reform, on the other hand, would raise the capital/labour ratio to 6.604 and yield a 15.9 per cent increase in steady-state consumption, or an 11.7 per cent welfare gain as a fraction of lifetime income. (Note that the capital/labour ratio increases less under the earnings tax because it yields lower private saving than expenditure tax, as discussed in the previous section.)

One of the major reasons for the considerable increase in capital/labour ratios under the WT and ET reforms in Summers' simulations is the incorporation in his multi-period lifetimes of a realistic human-wealth effect. This effect is also responsible for the very large increases in steady-state consumption and welfare obtained, since Summers' economy is initially considerably below the golden-rule capital intensity. That is, much of the payoff to ET and WT reforms in Summers' model comes not from a removal of the distortion in individual saving modeled, for example, in our discussion of dynamic partial equilibrium studies above, but from the growth effects of the sizable boost in investment expected to accompany WT or ET reform.

It is interesting and important to note that while Summers' WT reform produced an increase in steady-state consumption not much less than obtained from ET reform, the welfare gain is less than half as great from WT reform as from ET reform. The explanation lies in the observation in the previous section that, since under an earnings tax revenues are collected earlier in the lifetime, the present value of the lifetime tax burden for the representative taxpayer will be greater under an earnings tax than under an expenditure tax despite the fact that government revenue is the same in the two regimes in any given year.

Interesting as was Summers' contribution, it represented quite a preliminary effort. Its limitations include: insufficient sensitivity analysis; neglect of labour/leisure choice and human capital investment; neglect of a transitional period between steady states;[12] lack of sectoral detail; closed-economy framework; and lack of bequest motive.

Evans (1983) found that Summers' aggregate savings elasticities were remarkably sensitive to the rates of time preference, productivity growth, and population growth assumed. Although Evans did not repeat the tax simulation exercise with a range of alternative values of these parameters, since much of the welfare gain from consumption and wage tax innovations in Summers' paper was due to the increase in capital intensity due to higher saving, it appears likely that the very large welfare gains from these tax reforms that Summers obtained are likewise far from robust.

Auerbach, Kotlikoff, and Skinner (1983),[13] from now on referred to as "AKS," extended Summers' work by modeling transition under the assumption of rational expectations. They also incorporated labour/leisure choice. The influence of the latter could be judged by comparing the change in steady-state magnitudes induced by removing capital income taxes *if* AKS had preserved Summers' model in other respects. Unfortunately, a number of changes were made in addition to allowing labour/leisure choice: 1) the initial tax rate on capital income was 30 per cent vs. Summers' rate of 50 per cent; 2) σ was set at 0.25 instead of Summers' values of 0.5 and 1; 3) population growth of 1 instead of 1.5 per cent was assumed; 4) zero productivity growth instead of 2 per cent was assumed; and 5) the rate of time preference was set at 1.5 instead of 3 per cent. It is clear that using a lower tax rate and intertemporal elasticity of substitution will generate both smaller saving effects and welfare gains from removing capital income taxation. Evans (1983) has demonstrated that the same influence is exerted by lower rates of population growth, technical change, and time preference. The relative influence on the size of welfare changes of allowing labour/leisure choice, as opposed to making these other five changes compared with Summers, therefore unfortunately cannot be assessed.

The AKS results, relative to Summers', show smaller changes in capital/labour ratios and reduced welfare gains under both ET and WT reforms.[14] In comparison with Summers' $\sigma = 1$ case, the AKS capital/labour ratio rises only 44 per cent vs. Summers' 74 per cent under CT reform, and just 14 per cent vs. Summers' 54 per cent under WT reform.[15] Expenditure tax produces a steady-state welfare gain of 6 per cent, compared to 12 per cent in both Summers' $\sigma = 0.5$ and $\sigma = 1$ cases. Wage tax, on the other hand, generates a welfare *loss* equal to 4 per cent of lifetime income in the steady state vs. Summers' gains of 5 and 1 per cent in the $\sigma = 1$ and $\sigma = 0.5$ cases, respectively.[16]

The principal contribution of AKS lay in showing just how important is the transition from an initial steady state to one in which capital income taxation has been removed. If debt policy, or appropriate "grandfathering," could not be used, under ET reform older cohorts alive at the time of the policy change experience an unexpected additional tax burden.[17] Not only the retired but, in fact, all cohorts aged older than 38 at the policy change are net losers. The benefit of being able to save at an undistorted rate of return is simply swamped by an increase in tax liability that arises because the older cohorts' share of the expenditure tax base is greater than that of an income tax base. Those younger than 38 gain, of course, due to the shift in current tax burdens towards older cohorts, but also due to the increase in real incomes in the future arising from the increased rate of capital formation.

Under WT reform, almost exactly the opposite distribution of gains and losses between cohorts occurs. Relative to income, earnings occur earlier in life. Those retired at the time of the policy change, for example, thus unexpectedly escape *all* taxation through to death (in the initial tax regime they would have been taxed on the capital income from their life-cycle saving). All those over age 38 now benefit from the tax change, since their relative share of the earnings tax base is smaller than of the income tax base.

The fact that in a steady state there is a gain, or loss, of a certain amount in each cohort's welfare does not tell us whether the tax reform considered should be accepted or rejected on efficiency grounds because, as we have seen, under both ET and WT reforms, when the transitional cohorts are taken into account, some cohorts gain and some lose. A reform would only represent a Pareto improvement (or Pareto disimprovement) if all cohorts could be made to benefit (lose). AKS therefore ask whether the ET and WT reforms can be arranged in such a way that Pareto changes occur.

In order to assess the possibility of a Pareto improvement, AKS considered simulations in which the transition generations are compensated by lump-sum transfers from (or to) later cohorts so that they neither gain nor lose from tax reform. If all cohorts alive at the time of the policy change are fully compensated, the welfare gain from ET reform for all future cohorts equals 2 per cent of their lifetime incomes, while the welfare loss for all future cohorts under the WT reform is also 2 per cent.

Under the ET reform modeled by Summers and AKS, all savings present at the time of tax reform would become "registered," in the terminology of the last chapter. Since nonregistered assets would not have benefited from a deduction on acquisition, this is highly confiscatory. This extreme approach is the source of much of the adverse intergenerational distributional effect.

Daly et al. (1985) model a tax reform much closer to the Blueprints scheme. Unlimited registered saving is allowed, but taxpayers may also save in assets whose return is fully taxable. Daly et al. find that their scheme generates a greater welfare improvement in the steady state than the Summers- or AKS-style expenditure tax.[18] Welfare gains would likely be even greater under the full Blueprints scheme, which is even more encouraging towards saving. Daly et al. (1986) extend these results by considering transition and show that the extreme intergenerational redistribution obtained by AKS is greatly reduced when assets held in the nonregistered form prior to tax reform are not declared to be registered when the policy change takes place.

Multisector Models

The Summers and AKS models both make use of a particularly simple dynamic structure for the economy. There is a single productive sector producing a homogeneous good that can be used for consumption or capital formation. It is interesting to examine a richer model in which there is more than one consumption good and a distinction between consumption and capital goods. It is possible that what are often thought of as purely static distortions of the allocation of resources between different productive sectors at a moment in time may interact with intertemporal distortions to produce overall welfare losses that exceed the sum of "static" and "dynamic" loss estimates derived, respectively, from single-period applied general equilibrium (AGE) models and from the type of simulations used by Summers and AKS.

The first attempt to integrate the analysis of static and dynamic distortions of capital utilization and formation was the dynamic-sequenced AGE model for the United States developed by Fullerton, Shoven, and Whalley (1983), from now on referred to as "FSW." This used 19 industrial sectors, a single capital good, and 12 consumer types. It modeled saving and investment on the basis of infinitely lived consumers and myopic expectations. A wide variety of tax reform simulations were performed, with the existing U.S. tax structure modeled in much more faithful detail than by, for example, Summers and AKS.

The FSW simulation comparable with experiments performed by Summers and AKS replaced both U.S. PIT and CIT by an expenditure tax. This produces an aggregate gain equal to about 3 per cent of lifetime income. WT reform is not modeled. However, the impact of comprehensive income tax reform is investigated. Depending on the method used to preserve tax yield, this can produce either a small welfare gain (up to 0.3 per cent of lifetime income) or a small welfare loss (up to 0.05 per cent).

A comparison of the FSW welfare gain from ET reform with the Summers and AKS gains has to be made with some care for two reasons. First, the FSW gain is expressed as the present value of all future gains, whereas the AKS 2 per cent gain, for example, is the increase in welfare for all future *cohorts* – lump-sum redistribution being employed to ensure that cohorts alive at the time of the policy change experience a zero welfare change. If the AKS gains, which occur disproportionately in the future, were discounted to the present, in a procedure more comparable to that of FSW, a gain much smaller than 2 per cent of lifetime income would be obtained. From this point of view the FSW gains look much larger than the AKS gains.

The second difference between AKS and FSW in the presentation of welfare gains lies in the fact that lifetime income is not directly comparable between the two studies. Although the *concept* of lifetime income is the same in both cases – including the value of leisure as well as pecuniary income – the importance of leisure differs considerably between the studies. In both cases the benchmark equilibrium has labour supply at a standard 40 hours a week, but in AKS there are 100 hours per week available for work or leisure, while in FSW only 70 hours per week are in this discretionary category. Thus, if FSW allowed as much leisure per week as AKS, their lifetime income figures would rise by a factor of 100/70. Making this adjustment, the FSW welfare gain under CT reform of 3 per cent falls to about 2 per cent, closer to the AKS level.

If the FSW and AKS welfare gains both stood at 2 per cent when lifetime income was comparably measured, it would still be the case that the FSW welfare gain was actually much larger than the AKS, due to the fact that the FSW gain is the present value of all future gains, while the AKS does not apply to cohorts alive at the time of the policy change, as discussed above. While this difference could clearly be due to many differences between the AKS and FSW models, a significant part of the explanation may be the incorporation of multisectoral detail in FSW. Thus when CT reform occurs, the CIT is completely integrated with PIT, and Harberger's static welfare loss from misallocation of capital between the corporate and noncorporate sectors disappears.

Finally, it is interesting to note that just as Shoven and Whalley (1972) found that Harberger's local approximation technique had provided a fairly good estimate of the static welfare loss from CIT-induced misallocation of resources, the FSW results imply that Feldstein (1978) had essentially got the right answer for the sum of static and dynamic welfare losses of capital income taxation in a closed economy. Recall that Feldstein's results suggested an overall loss from capital income taxation of about 2.5 per cent of GNP, clearly in the same neighbourhood as FSW's 2 per cent of lifetime income. This coincidence of results is more remarkable than in the Harberger vs. Shoven and Whalley comparison, however, since the structure of the Feldstein and FSW models varies considerably more. In particular, the Feldstein model captures none of the payoff from moving the economy closer to the golden-rule balanced-growth path.

The FSW-type of simulation cannot be regarded as the final word, if only because of its use of infinitely lived consumers. In fact, the departure from the life-cycle saving paradigm makes it very difficult to know whether comparable sensitivity of saving with respect to the after-tax rate of return is being incorporated as in, say, the AKS model.

Open-Economy Models

Like the partial equilibrium work that went before, all the dynamic general equilibrium modeling reviewed here so far is for a closed economy. This reduces its value in providing guidance for policy in a small open economy like Canada's, which is exposed to a high degree of international capital mobility.

As discussed elsewhere in this study (see Chapter 5), the level of investment in Canada may be seen as adjusting to equate the return on capital to that available in international markets. Thus the large increase in domestic saving projected under WT or ET reform in studies like those of Summers, AKS, and FSW might have a considerably dampened effect on capital formation in Canada. In the extreme case, with perfect capital mobility and foreigners' tax liability determined in their home countries via tax credit mechanisms, removal of capital income taxes in Canada does not affect the national capital stock at all, as long as foreigners remain the marginal investors. Domestic saving increases, but it merely supplants foreign capital. In this type of case the major benefit of WT or ET reform realized in the Summers and other dynamic closed-economy models of moving closer to the golden-rule capital intensity is not obtained (Gauthier, 1986). Chapter 5 argues, however, that this extreme case does not capture the true Canadian situation.

Summary

As made clear in this chapter, there is a wealth of results on the welfare gains (or losses) that might result from replacement of capital income taxes by consumption or wage taxes in a closed economy. Widely varying levels of analysis, assumptions on critical elasticities, and tax structure have been employed. Still there is a common core of agreement on the ideal procedure that makes one hopeful that some consensus may emerge. There is a widely shared view that a zero-bequest life-cycle model with endogenous labour supply in all periods is a useful vehicle for the analysis. (There is also agreement that the incorporation of bequests would be a worthwhile extension. Work in this area is reviewed in Chapter 8.) The studies differ in the degree to which they approximate this ideal.

As we have seen, although in a world of uncertainty it has been argued that the risk-sharing role of corporate income tax may make it nondistortionary, ignoring uncertainty there is broad agreement that the static welfare loss from the misallocation of factors across sectors caused by differences in rates of capital income taxation (for example, between corporate and noncorporate sectors) is in the neighbourhood of Harberger's initial estimate – 0.5 per cent of GNP. In addition, there is evidence (Feldstein, 1978) that by increasing the overall rate of capital income taxation above that which would otherwise be obtained, CIT imposes an additional welfare loss perhaps in the neighbourhood of another 0.5 per cent of GNP.

Turning to intertemporal distortions there is significant disagreement. However, we will argue that this is more apparent than real. Thus, although considerable further work remains to be done in extending and checking current modeling, we believe that something can be learned from the cumulative efforts of different researchers already.

At the level of partial equilibrium study we found that Feldstein's two-period model with complete retirement suggested a total welfare loss from capital income taxation (including static losses from CIT) of about 2.5 per cent of GNP. Driffill and Rosen (1983) have applied the much more attractive methodology of comparing actual solutions of a model with 55 years of adulthood, endogenous labour supply throughout life, and realistic age/wage profiles. Their results indicate, we have argued, a likely welfare gain of switching from income taxation to consumption taxation of at least 5 per cent of GNP, if the benchmark income tax rate was in the 40 per cent neighbourhood considered by Feldstein.

While the disagreement of results between Feldstein and Driffill and Rosen is unfortunate, it is hardly unsettling in view of the considerable difference in methodology. What is perhaps more unsettling, at first, is to find that the dynamic general equilibrium studies obtain smaller welfare gains from ET reform, when these are correctly assessed, than did Driffill and Rosen. However, this quandary may be resolved, to some extent, by the fact that Driffill and Rosen employ an equal present-value yield comparison whereas the dynamic GE models hold the government revenue path constant, which implies an increase in the present value of taxes paid under ET reform.

The dynamic GE results of Summers, AKS, and FSW can be reconciled if the effects of differences in key parameters and model structure are kept in mind. Summers found steady-state welfare gains of ET reform in excess of 10 per cent of lifetime income. AKS obtained a corresponding figure of 6 per cent, with the reduction apparently explained by at least six changes in parameters and specification which it is known should reduce the welfare gain. Thus the results of Summers and AKS may be reconcilable.

We learn from AKS that changing parameters a bit, and examining transition, can make ET and WT reforms look much less attractive than Summers' 10 per cent steady-state welfare gain made them appear. With transition taken into account, the 6 per cent steady-state welfare gain turns into a 2 per cent gain – and this gain is only received by cohorts who have not begun life at the time of policy change!

While the AKS results make ET and WT reforms look uninspiring from an efficiency point of view, FSW obtain better effects from ET reform. There is a present-value welfare gain equal to about 2 or 3 per cent of lifetime income (depending on the value of leisure assumed). This larger gain may be due, at least in part, to the greater richness of the model in sectoral and taxation detail. A promising avenue for future research is to see how this welfare gain changes when life-cycle saving is introduced into the dynamic-sequenced GE approach by FSW.

Finally, we have noted that almost all the dynamic general equilibrium literature on the welfare effects of tax reform available to date has been performed for a closed economy. In an open economy like Canada's, which is exposed to a high degree of international capital mobility, there is an important question of whether the removal of capital income taxation would in fact increase capital formation significantly. If foreign investors are marginal, and face a foreign tax credit mechanism at home, under certain circumstances they will feel no incentive effect from Canadian tax cuts, and the domestic capital stock will not respond to such tax measures. This issue is discussed in detail in the next chapter.

Conclusion

This chapter has surveyed research on the efficiency effects of wage, consumption, and income taxes. This literature does not examine the Blueprints-style consumption tax discussed in earlier chapters. However, recent work by Daly et al. (1985) suggests that the results would extend, qualitatively, to the Blueprints proposal. On current evidence, we conclude that, in a closed economy, the sectoral misallocation of capital due to corporate income tax and the general impact of capital income taxes on saving and investment would likely be responsible for a welfare loss, in annual terms, of less than 5 per cent of GNP. The possible welfare gains from consumption tax reform, however, are inadequately reflected in this figure due to the neglect of the open economy and human capital. An implication of later chapters is that bringing in the open economy and human capital could increase the estimated welfare gains.

5 Tax Treatment of Capital Income in an Open Economy

Tax reform cannot be pursued as if we lived in a closed economy. For Canada, economic relations with other countries are extremely important. A large fraction of the capital income earned in Canada accrues to nonresidents, and Canadian residents are increasingly investing abroad, so that taxation of their investment incomes depends on foreign tax regimes as well as the domestic regime. It has been argued (Graetz, 1980, pp. 248-54) that the international dimension of tax reform is very important in the United States. This dimension has to be regarded as of even greater significance in Canada.

In this chapter we first set out briefly the institutions that currently govern the tax treatment of Canadian residents' capital income from abroad and nonresidents' Canadian capital income. We then explore possible implications of the open economy for desirable capital income tax policy both with respect to residents and nonresidents. This leads into a discussion of how the guidelines suggested might fit into reform of the Canadian tax system along CT and UIT lines, respectively. In both we find that adoption of the tax features suggested by open-economy considerations is technically feasible, but that difficulties in international relations may arise either under CT or UIT as a result of a desire to discriminate on the basis of taxpayers' residence. These difficulties are more severe in the CT case, suggesting that the pure CT reform discussed in previous chapters may have to be modified in the light of constraints imposed by international tax relations.

It is important to point out that we are only able to scratch the surface of open-economy implications for capital income tax reform in this chapter. The intention is to survey the important considerations. Our conclusions are necessarily tentative, especially since they depend on empirical magnitudes and patterns of behaviour that have not yet been firmly established in the literature.

Institutional Setting of International Tax Relations

International tax relations are not subject to any multilateral agreement along the lines of GATT, applying to trade in goods and services. Those countries with important interrelations in taxation, particularly of capital income, however, normally have entered into bilateral tax treaties that impose constraints on their treatment of nonresidents' capital income. In addition, there is a general recognition of the primary right of the country where capital income is earned – the "source" country – to tax that income.

An important element in tax treaties – for example, the Canada/U.S. treaty that came into force in 1984 – is the prohibition of discriminatory taxation of nonresidents' capital income, with some exceptions, for example, withholding taxes on interest and dividend payments, whose size is generally limited by treaty. Despite the undertakings of tax treaties, in practice important elements of discrimination do arise in the treatment of nonresidents' capital income. In the Canadian case, examples are provided by our special low CIT rate for small Canadian-controlled private corporations and the dividend tax credit. The latter in particular has aroused resentment in the United States since the credit is in effect a mechanism for lightening the burden of corporate taxation for Canadian shareholders. The official Canadian position appears to be that such measures represent an incentive for Canadians rather than discrimination against nonresidents.

Despite the elements of discrimination against nonresidents' capital income that are present in the Canadian tax system, there are no doubt degrees of discrimination that would place us in violation of our treaty obligations. This clearly places constraints on Canadian tax policy, even if these are somewhat ill-defined and perhaps shifting over time.

International Tax Provisions

Briefly, the current provisions affecting the taxation of returns to foreign direct investment are as follows.[1] Canadian corporations carrying on business abroad can generally repatriate their active business income as "tax-exempt surplus" without liability for CIT in Canada. This represents the exemption approach to adjusting domestic tax liability on account of foreign taxes already paid. The United States takes the alternative approach, which is to provide a credit for CIT paid in Canada. It is important to note that a U.S. corporation is only assessed in the United States for CIT on its Canadian subsidiary's income when profits are repatriated. Also note that a credit would only be provided up to the amount of U.S. tax assessed.[2]

The foreign tax credit mechanism in the United States requires further comment since it has an impact on the design of capital income taxation (particularly via the CIT) in Canada. It has been widely believed that, given the high proportion of corporate profits in Canada that accrue to U.S. subsidiaries, the existence of this mechanism in itself provides a powerful argument for maintaining Canadian CIT rates not much lower than U.S. rates. If either the United States taxed the foreign earnings of its corporations on a current basis or subsidiaries' profits were repatriated to the United States immediately, the result of a reduction in Canadian CIT payments would generally be an offsetting increase in U.S. tax on income from Canadian operations via the "treasury transfer effect." For U.S. subsidiaries, increases in the Canadian CIT rate up to the U.S. rate would generally result in taxes flowing into the Canadian treasury rather than the U.S. treasury.[3] Furthermore, it has been widely believed that since the total ultimate tax liability on subsidiaries' operations is unchanged, the rise in Canadian CIT described would have no disincentive effect for U.S. multinationals investing in Canada.

Recently, the above view of the foreign tax credit mechanism and treasury transfer effect has been challenged on two counts. First, Hartman (1985) has argued (convincingly in our view) that, although the U.S. CIT rate affects the effective tax rate for immature U.S. subsidiaries whose investment is financed by the parent, this is not the case for mature subsidiaries. The latter finance investment from their own retained earnings and are more representative of U.S. subsidiaries in Canada. For mature subsidiaries, since U.S. taxes are only paid when earnings are repatriated, U.S. tax liability reduces the true costs and returns to retaining $1 and reinvesting it in Canada by the same fraction (unless U.S. tax rates are changing over time). The result is that for mature U.S. subsidiaries the effective tax rate in Canada is the Canadian CIT rate, and a rise in the latter will discourage investment. There is also a disincentive effect for immature subsidiaries since although their effective tax rate does not *equal* the Canadian CIT rate, except in the case of immediate repatriation of earnings, it is negatively related to the Canadian CIT rate.

The other recent objection to the conventional view on the foreign tax credit mechanism is that U.S. subsidiaries are in fact able to appropriate a large part of the benefit of a Canadian CIT reduction for themselves – that is, prevent its accrual to the U.S. treasury. The most obvious such mechanism is simply *deferral*. U.S. taxes do not have to be paid until earnings are repatriated, so that a reduction in Canadian CIT of, say, $1 million may be replaced by the payment of $1 million to the U.S. treasury 10 or 20 years hence. In present-value terms there is a substantial reduction in tax liability, and therefore a much weakened treasury transfer effect. Other methods whereby U.S. tax liability may be avoided are set out by Brean (1984, p. 46) who concludes that "zero residence tax liability is a reasonable approximation to the present tax treatment of...U.S. foreign direct investment." If this is the case, reductions in Canadian CIT cannot be opposed on the simple grounds that they will only result in an increase in payments to the U.S. treasury.

With respect to portfolio investment, tax code provisions are less generous than with respect to foreign direct investment. For example, the Canadian foreign tax credit on interest or dividends received from abroad has a ceiling equal to 15 per cent of the income involved. No credit is received, of course, for business taxes paid by the foreign concerns paying the interest and dividends.[4]

Open-Economy Implications for Tax Policy – Small Open Economy

A "small" open economy is one that is a strict price-taker. It has no influence on rates of return in world capital markets, or on world prices of tradeable goods and services because of its size. It is particularly easy to characterize desirable tax policy in the open-economy setting under the assumption that the economy is small. Here we apply this type of analysis to the Canadian case, but with the reservation that it can only represent a first approximation. In fact, in certain important respects – discussed later – Canada is not "small." These features of our international situation turn out to have important tax policy implications.

A first question we can ask is whether, from the viewpoint of the national interest, it is desirable to provide credits for taxes paid by Canadian residents on capital income earned abroad. In the small open-economy setting there is a strong argument that the answer is no.

Oversimplifying somewhat, the efficiency argument for domestic CT treatment is that the before-tax rate of return is the rate at which current consumption can be transformed into future consumption. Distorting this relative price is inefficient. A tax on capital income makes future consumption more expensive to the consumer than it is to the economy. The individual, therefore, has a tendency to economize too much on future consumption – there is a substitution effect towards too much current consumption.

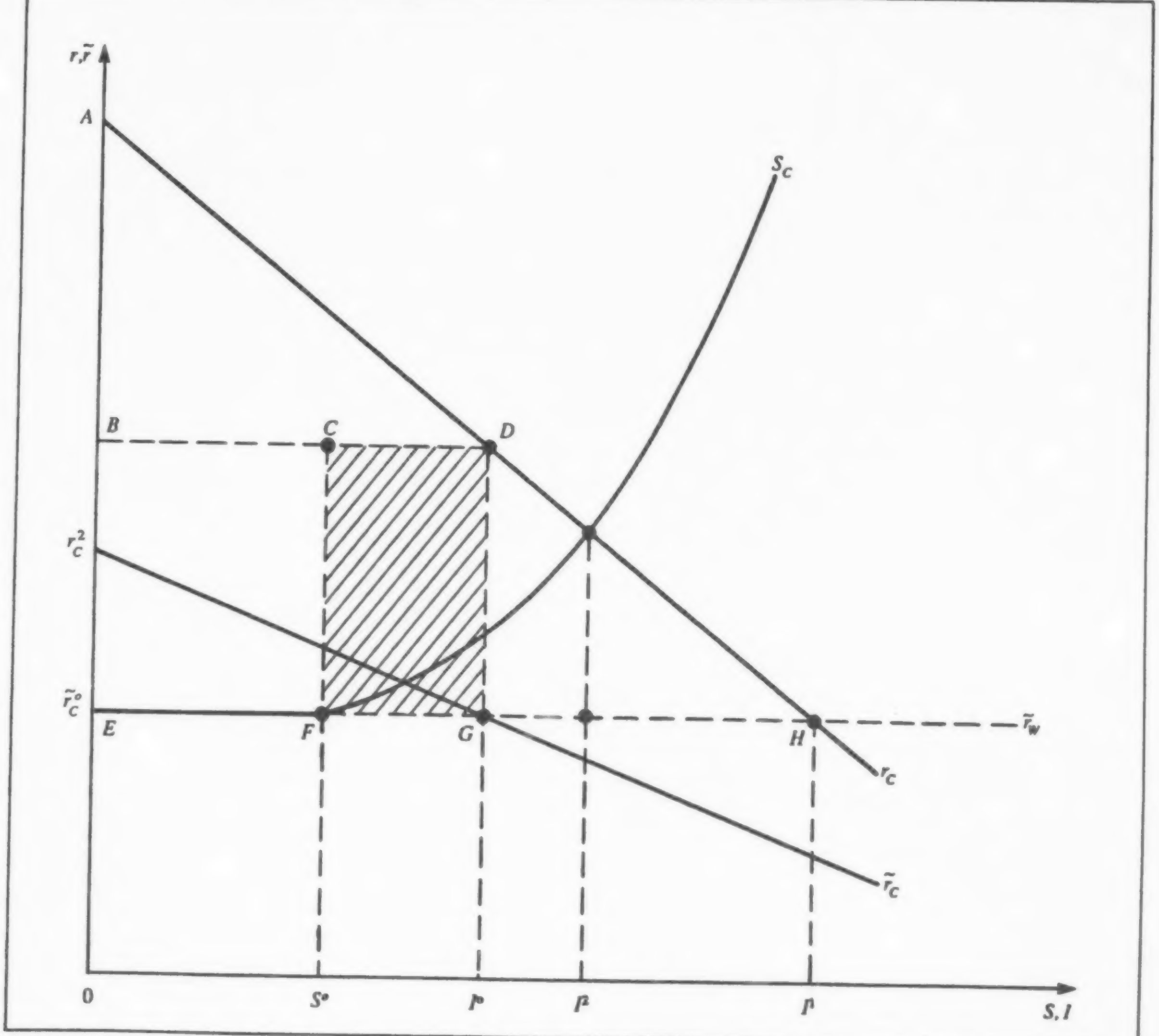
In the case of foreign capital income the argument is different. The rate at which Canadians can transform current consumption into future consumption by using foreign capital markets is *not* given by the pre-tax rate of return. The reason is that foreign governments confiscate part of the return, and that part is not available to Canadians.[5] Thus, from the point of view of the Canadian interest, there is not a simple argument on efficiency grounds for compensating Canadians investing abroad for foreign taxes on capital income. From the point of view of "world efficiency," however, such compensation would be required, that is, it is necessary for "capital export neutrality."[6]

A second important question is whether, in principle, we should tax nonresidents' Canadian capital income. For the purpose of this discussion we assume that it has been decided to adopt CT reform in Canada, so that there is no capital income tax on residents. The discussion proceeds with the help of Figure 5-1.

Figure 5-1 shows a (very simplified) hypothetical structure of demand and supply for loanable funds in the domestic capital market. On the vertical axis we have

Figure 5-1

Domestic Capital Market Equilibria: Nondiscriminatory Case



before- and after-tax rates of return, r and $\tilde{r}$, respectively, and on the horizontal axis, flows of saving, S, and investment, I, in Canada. (The analysis could be performed in terms of *stocks* of savings and capital instead, with no difference in the formal results.)

The initial situation depicted in Figure 5-1 is one where there is a common proportional tax rate on investment income of all kinds at home and abroad. In this initial situation it makes no difference whether taxes are levied on a "source" or "residence" basis. However, for the later analysis, we need the same basis to be in effect for the most part.

An important role is played by the world level of after-tax rates of return, $\tilde{r}_W$, which we assume is constant and the same for all investors. This rate of return is earned on all investments outside Canada. It sets a floor below which the after-tax return to saving in Canada, $\tilde{r}_C$, cannot decline. Thus the domestic saving schedule is initially horizontal – no saving will be done using domestic instruments unless the rate $\tilde{r}_W$ is provided. There is a maximum amount of domestic saving that will occur at this rate of return – here denoted as S^o. In order to induce higher domestic saving the after-tax rate of return must rise, as indicated by the saving schedule.

The other side of the domestic capital market is represented by the usual "marginal efficiency of investment" schedule, which shows the (declining) marginal before-tax returns on investment projects in Canada, r_C. For simplicity, this is shown as a linear schedule. There is also a linear schedule for the after-tax marginal returns on investment, $\tilde{r}_C$.

As the saving and rate of return schedules have been drawn, the initial equilibrium will feature domestic savings of S^o and an inflow of foreign capital, $I^o - S^o$. This inflow will be sufficient to bring the after-tax return on investment in Canada down to the world level, $\tilde{r}_W$, making foreign investors indifferent between investing the marginal dollar in Canada or abroad.

What will happen when a CT reform is introduced in Canada? This will remove the tax on domestic capital income for Canadian residents and make $\tilde{r}_C$ coincide with r_C, from their point of view. Two possible routes can be taken with respect to foreign investment: CT treatment can be extended to it so that for nonresidents as well as residents the $\tilde{r}_C$ and r_C schedules correspond, *or* nonresidents may continue to pay taxes to Canada on their Canadian capital income so that the relevant rate of return schedule for foreigners remains $\tilde{r}_C$. This statement assumes that when Canadian capital income taxes are removed they are not simply replaced by increased tax liability of foreign investors in their home countries.[7] In view of the arguments of Hartman (1985) and the widespread deferral of the taxes levied by foreign treasuries, when Canadian capital income taxes are removed foreign investors will generally experience a decline in the effective tax rate.

If the CT reform is extended to foreign as well as domestic investors, in the simplified world of Figure 5-1, a new equilibrium will be reached where again the after-tax rate of return on Canadian investment is equal to the after-tax world return, $\tilde{r}_W$. However, there will be much more investment in Canada, since the after-tax Canadian rate of return in fact corresponds to the before-tax return. Total investment will equal I^1 in the diagram. Note that since the net rate of return to domestic savers has not changed, Canadians' saving is also unchanged at S^o.[8] What has occurred is a great increase in foreign investment – from $I^o - S^o$ to $I^1 - S^o$.

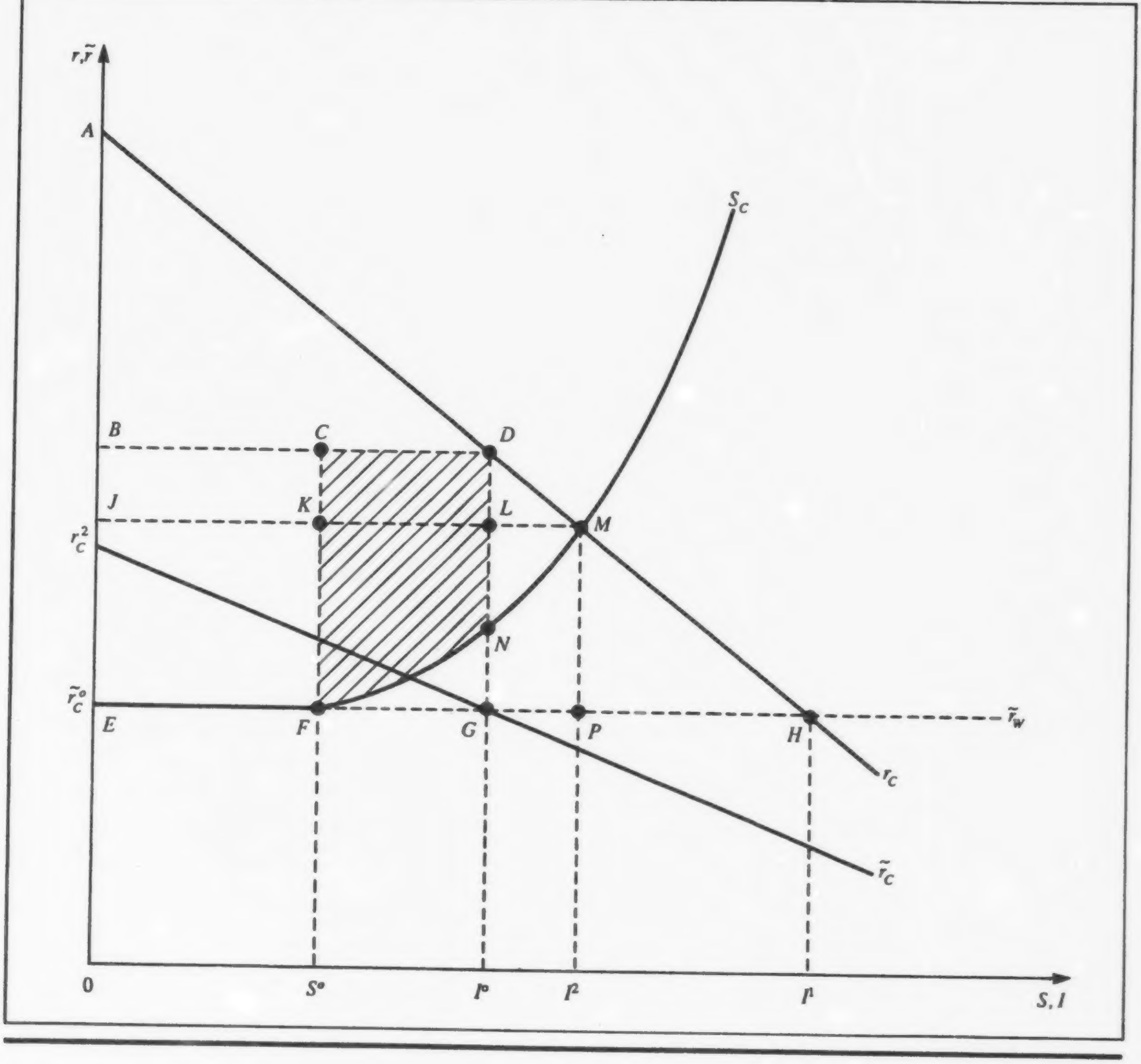
It is important to note that capital, including nonresident capital, is unaffected by the tax reform illustrated in Figure 5-1. It earns the same world after-tax rate of return irrespective of what we do. This means that any "surplus" under the investment funds demand schedule accrues to Canadians. To a good approximation this surplus may be thought of as garnered by the internationally immobile factors of production. The surplus from a larger capital stock accrues to these other factors by increasing their marginal products and, therefore, their competitive rental rates. Thus, for example, in the initial situation, with the capital income tax in force, the area *ABD* represents a gain to immobile factors of production (i.e., in the form of higher real wages, rents, etc.), while the government extracts *BDGE* by taxation.

After capital income taxes are removed, Figure 5-1 indicates that there is an unambiguous welfare gain to Canada, given the small open-economy assumptions. It is true that the Canadian treasury loses the former revenue *BDGE*. However, the Canadian private sector makes a corresponding gain – the incomes of immobile factors will increase by this amount. Incomes of co-operating factors also increase by the area of the triangle *DGH*. Thus the real income gains to residents exceed the loss to the treasury by the amount of the welfare triangle *DGH*.

What difference would it make in the small open-economy setting if, instead of removing capital income tax from everyone, it were possible to discriminate against nonresidents? Figure 5-2 illustrates the effects of removing capital income tax for residents, but leaving it unchanged for nonresidents.

Figure 5-2

Domestic Capital Market Equilibria: Discriminatory Case



If CT treatment is not extended to foreign capital, the results are very different from those illustrated in Figure 5-1. As the schedules have been drawn in Figure 5-2, foreign capital will in fact be fully "crowded out" by Canadian capital. A new equilibrium will be reached with both domestic saving and investment at the level I^2. No foreign investment will occur since at this level $\tilde{r}_C < \tilde{r}_W$ (for nonresidents). Note that the increase in saving by Canadians ($I^2 - S^o$) will exceed the increase in investment ($I^2 - I^o$) by the loss of foreign investment ($I^o - S^o$).

The welfare implications of the Figure 5-2 experiment are quite different from those of Figure 5-1. Now the surplus created by the employment of capital in the Canadian economy would be *AEPM* (rather than *AEII*) if the cost of all funds remained at the previous level. However, the area *FPM* under the saving supply schedule represents a new cost of funds due to the provision of the full capital stock out of domestic saving. Thus *FPM* must be deducted from *AEPM* in calculating the net surplus. When this is done it is not clear that the policy experiment generates an improvement: we gain the area *DNM* but lose the area *FGN*. Depending on the shape of the domestic saving schedule, the net gain from removing capital income tax from residents only may be either positive or negative. The intuition is that while we are increasing the domestic capital stock and increasing the incomes of Canadian residents who own immobile factors of production, we are also using a more "expensive" source of funds – domestic saving rather than international capital markets. The net outcome depends on the strength of these competing effects.

The conclusion from a comparison of Figures 5-1 and 5-2 is that in the open-economy case it makes sense on efficiency grounds to remove capital income tax for nonresidents as well as residents, given that the "treasury transfer effect" is weak or inoperative.[9] The result of failing to extend the reform to nonresidents is 1) to reduce the gain in real income to immobile factors of production, and 2) to increase the true cost of investment capital since, in equilibrium, Canadian savers (who are the marginal source of funds) require a higher rate of return than would be required by nonresidents.

Open Economy with Terms-of-Trade Effects

The small open-economy assumption is almost certainly inadequate in the Canadian case. While it may be true that we have little impact on the world prices of many of the commodities we import, our exports typically bulk large in the markets they supply. (Think, for example, of our influence on the price of pulp and paper or other forest products in North America.) Fallon (1985) estimates that, far from Canadian exports being in infinitely elastic demand in the rest of the world (the small open-economy assumption), their average price elasticity of demand is about –2.5.

The fact that Canada does not really represent a small open economy has wide-ranging effects in the discussion of tax policy. Relative to the composition of GDP, we are large importers of manufactures and large exporters of primary commodities. Tax policy can therefore be used to improve the terms of trade by, for example, taxing domestic manufacturers relatively lightly and primary producers relatively heavily (e.g, under CIT). Alternatively, we could try to improve the terms of trade via nonuniform indirect taxes, for example, by levying a higher rate of tax on manufactures (as is done by the federal sales tax).[10] Such measures fly in the face of the kind of policy often thought desirable in the closed-economy situation – that is, a structure of uniform-rate broadly based taxes.

Here we will discuss two ways in which terms-of-trade effects affect desirable capital income tax policy in Canada. The first has to do with intersectoral allocation of capital. In a general equilibrium model with fixed stocks of capital and labour in each of several major trading blocs, Whalley (1980) found that the United States was better off with its distortionary factor income taxes than with an equal-yield broadly based sales tax replacement, due to terms-of-trade effects. CIT and other factor taxes hit the manufacturing sector most heavily. Since manufactures have a large share of U.S. exports, U.S. factor taxes, according to Whalley's results, create a national welfare gain for the U.S. via the exercise of some monopoly power in export markets.

Because Canada is a heavy importer of manufactured goods, an extension of Whalley's argument would likely suggest heavy factor (or other producer-side) taxes in our primary sector, and light taxes in the manufacturing sector. Since the manufacturing sector is relatively lightly taxed under CIT, we already follow this advice to an extent. However, we do not appear to implement the other component of the policy – high factor taxes in the primary industries. Whether higher taxes in this sector might be advisable, on the grounds of expected terms-of-trade effects, is an issue that would require much more detailed examination than we can give it here.

Interestingly, both Boadway and Treddenick (1978) and Thirsk (1985), in open-economy general equilibrium calculations for Canada, find that an increase in CIT would have a beneficial terms-of-trade effect. That such a parallel to Whalley's result for the United States should be obtained is perhaps surprising, given the fundamental differences in the trade patterns of Canada and the United States. It may seem remarkable that increases in CIT in both the United States and Canada should improve the two countries' respective terms of trade. The explanation may be that the CIT structures in the two countries have been subtly adjusted to achieve terms-of-trade benefits (e.g., in the Canadian case by taxing manufacturing relatively lightly).

The analyses of Whalley (1980), Boadway and Treddenick (1978), and Thirsk (1985) all considered only the situation where factor supplies are fixed within national boundaries. Burgess (1985) examines the impact of capital income taxation on the terms of trade in an intertemporal context. Additional foreign borrowing, or the supply of nonresident direct investment, increases the stream of debt service and repatriated profits flowing abroad. In order to make these payments the Canadian economy must obtain foreign exchange, and the only way to do this is via exports. Thus, increased inputs of foreign capital lead to a need for increased exports in the future and, therefore, less advantageous terms of trade.

Illustrative calculations by Burgess (1985) suggest that the terms-of-trade cost of using nonresident capital may be quite high. These calculations assume that Canada is small in international capital markets (so that the cost of capital in terms of foreign currency is fixed),[11] that world prices for our imports are fixed, that there is a fixed volume of domestic saving, and that it is not possible to discriminate in capital income taxation between residents and nonresidents. In the absence of the foreign tax credit mechanism (see the discussion above), Burgess finds that the optimal capital income tax rate equals minus the inverse of the price elasticity of demand for our exports. With an export demand elasticity of –2.5, this implies a tax rate of 40 per cent. This is a radically different conclusion than obtained above under the small open-economy assumption, where the optimal rate of tax was zero.

If domestic savings respond positively to the after-tax real rate of return, the Thirsk/Burgess argument suggests an extreme form of discrimination between resident and nonresident capital. The only reason for levying capital income tax, in this framework, is to reduce the inflow of foreign capital in order to improve the terms of trade. If domestic saving responds positively to the after-tax rate of return, an unfortunate by-product will be the discouragement of some domestic saving. The induced reduction in domestic saving is obviously counter-productive from the trade policy point of view.

Capital Income Tax Reform

The discussion in the previous section has been suggestive, but it is unfortunately tentative and incomplete. We believe this reflects the limited state of current knowledge and analysis of the open-economy implications for capital income tax reform in Canada, as well as the limitations of the present study.

The studies by Whalley, Thirsk, Burgess, and others suggest that we ought to have an eye on terms-of-trade effects in designing many aspects of taxation in Canada. While their arguments are interesting, there are two important qualifications that must be noted before we consider possible implications for capital income tax reform:

1) It is not clear to what extent capital income taxation would be employed if we developed an optimal tax package using explicit models incorporating terms-of-trade effects. As discussed above, there are other aspects of taxation that can be used to manipulate the terms of trade. The degree to which capital income taxation ought to be used rather than, for example, selective indirect taxes is not clear, even if it were possible to discriminate against foreign capital. If only nondiscriminatory capital taxes are available, capital income taxation would not necessarily play a role in the optimal tax package.

2) Attempts to manipulate the terms of trade via tax policy are a species of "beggar thy neighbour" policy. One can generally count on the neighbours realizing this and responding in kind. A superior strategy may be to bargain for the mutual removal of such policies.

Despite these qualifications, it is interesting to investigate the implications for capital income tax reform of the proposition that it may be desirable, for terms-of-trade reasons, to implement some degree of capital income taxation in Canada, even if it is constrained not to discriminate against nonresidents.

The terms-of-trade considerations suggest it would be best to tax nonresidents' capital income but not residents'. This advice counsels a combination of consumption tax and income tax approaches: Canadian residents ought to be treated on a consumption tax basis and nonresidents should be subjected to elements of capital income tax.

Suppose one were convinced, perhaps on equity grounds, that the UIT approach would be appropriate if Canada were a closed economy. Then the observation that discriminatory capital income taxation cannot in fact be implemented would not be unsettling (although it might lead to significant changes in UIT design, including a need for CIT to withhold against foreigners, as discussed below). The efficiency rationale for taxing *nonresident* capital income would add to the case for UIT. On the other hand, for those convinced that the CT approach would be best for a closed economy such as Canada, a change in outlook is implied if we cannot have a consumption tax for Canadians and an income tax for foreigners. In this case the CT advocate might acquiesce in some capital income taxation at firm level.

A final point, before turning to some of the more detailed open-economy implications for CT and UIT reforms, is that the discussion so far has been entirely in terms of what Canada should do assuming the international environment is fixed. Changes in taxation in other countries, or in Canada's capital import/export situation, clearly can have a major impact on desirable tax policy in this country. A substantial reduction in capital income taxes in the United States, for example, would reduce the supply of foreign capital coming into Canada, and likely reduce the optimal rate of capital income tax applied in this country. Similar implications would follow from a continued secular movement for Canada away from capital importer towards capital exporter status.

Consumption Tax Reform

In the previous chapters we have set out the lifetime CT reform suggested by the Blueprints report, with its registered and nonregistered assets at the PIT level. This scheme effectively removes any burden of capital income tax at the personal level. There is nothing in international tax relations to say that we could not introduce such a scheme in Canada, and the "first-best" solution even in the open-economy case is to levy no tax on Canadian residents' capital income. Thus open-economy considerations do not imply that the CT approach needs to be abandoned at the PIT level.[12]

For CT advocates the main issue raised by the open economy concerns what to do about the corporate income tax. The two main options we have discussed earlier in this study are 1) that CIT should be abolished, and 2) that it should be converted into a "cash-flow" tax, which may be thought of (to a good approximation) as a tax on pure economic rent. The open-economy considerations discussed above clearly indicate that a third possibility is also important: a CIT falling on capital income (properly measured) at the corporate level, to exist alongside a Blueprints-style consumption-tax-type PIT.[13]

As noted above, it remains a possibility that, even when terms-of-trade considerations are brought into play and we take a narrow nationalistic approach, efficiency considerations will not suggest any use of capital income taxation. However, the CIT abolition option might well have to be rejected, even by the convinced CT advocate, if it could be shown that it was advisable to focus on capital income taxation to achieve terms-of-trade goals. Could the cash-flow CIT option fit the bill in this case?

The cash-flow alternative might give the appearance of levying a tax on capital income, but it is important to recall that the true base of such a tax does not include normal capital income, but only economic rent. A major implication is that a strict cash-flow CIT, which would, for example, allow payments from national revenue to firms in years with negative cash flow, would likely collect relatively little revenue. It would be unlikely to tax capital sufficiently hard to affect the terms of trade significantly.

The open-economy considerations thus could imply that even if we went the consumption tax route for PIT, we would want to levy CIT on capital income, rather than cash flow, at the corporate level. This would imply a need to reform the current CIT, with its numerous distortions, to make it uniform and neutral. Given the popularity of corporate taxes among the electorate, this option, which we refer to below as a "uniform CIT," is a realistic political possibility.

Having decided on a uniform CIT, there would be the remaining issue of what forms of integration between PIT and CIT should be pursued. In the absence of restrictions on discrimination against nonresidents, the ideal approach would be to integrate the two systems fully, so that CIT would be completely removed via tax credits at the PIT level, except on corporate-source income which was actually consumed. As we have pointed out above, however, this option is likely obviated by our treaty obligations not to discriminate.

Although extreme forms of integration of a uniform CIT and consumption-type PIT are ruled out by international tax relations, less extreme forms are clearly feasible. The Canadian dividend tax credit, for example, is explicitly protected in the U.S./Canada tax treaty of 1984. Also, the lower rate of tax for small Canadian-controlled private corporations is well established. These schemes of course reduce the weight of capital income taxes on Canadian residents and should probably be continued.

Uniform Income Tax

The conclusion from open-economy considerations that it could be desirable to have a uniform CIT in Canada might alter the design of UIT reform, as well as the outlook of CT advocates, substantially. As we have seen in earlier chapters, from the UIT point of view, a CIT is not required for equity or efficiency under ideal conditions. Provided difficulties of administration were not too severe, all direct taxation could proceed on the basis of a PIT with a Haig-Simons income base.

Having been told that he might want to have a uniform CIT because of terms-of-trade considerations, like the CT enthusiast the UIT advocate will look for ways to integrate CIT and PIT. The motivation (which differs a little from that in the CT case) for this integration is equity: individuals should pay tax according to their true economic income – the fact that a person gets more of his/her income from corporate sources should not saddle him/her with additional direct tax payments.

While the UIT approach suggests a similar response to CIT as under the CT approach, that is, a desire for full integration, integration means different things in the two cases. In the CT case it means removing the CIT burden from the individual completely (as long as corporate-source income is not being consumed). On the other hand, under UIT integration merely means that the uniform tax rate that has been applied to corporate-source income under the CIT will be corrected so that PIT and CIT payments total what would be paid if the corporate-source income accrued as ordinary income. Thus, while some low-income individuals will obtain a complete refund for CIT paid on their corporate-source income, high-income taxpayers may even pay a little extra tax over and above that extracted by CIT on this income.

That the results of integrating PIT and CIT differ considerably between consumption-type and UIT-type personal income tax likely means that it would be easier to convince other countries that integration with the UIT-type personal income tax is nondiscriminatory. (Integration which only removes part of the CIT burden at the personal level is less discriminatory than integration which removes the entire burden.) Thus international tax relations would constitute less of a barrier to the implementation of UIT reform in Canada than to CT reform, if it was desired to retain CIT as a tax on the return to shareholders' equity rather than as a cash-flow tax. It is important to note, however, that despite the terms-of-trade considerations sketched in this chapter, many CT advocates would continue to advocate a "stand-alone" cash-flow CIT. The latter would *not* be integrated with PIT and would *not* be discriminatory towards foreigners.

Conclusion

The main conclusion from this chapter is that open-economy considerations could modify guidelines for capital income tax reform if this reform is based on the consumption tax approach. If the basic desire is for uniform income taxation, open-economy considerations could again have some impact, but this would be less fundamental. Nonetheless, we do not see international considerations as a serious road block for either approach.

There are two major reasons why open-economy considerations might favour the retention of a corporate income tax falling on the return to shareholders' equity in Canada, even if we would prefer to abolish corporate income tax, or put it on a cash-flow basis, in a closed economy. One is that, given the high degree of foreign ownership in Canada, increases in Canadian CIT and withholding taxes could result in transfers from foreign to Canadian treasuries, via the foreign tax credit mechanism. We have seen, however, that this depends on the earnings of U.S. subsidiaries, especially, being repatriated quickly. Since, in fact, such earnings are to a large extent reinvested in Canada, it is not clear that this line of argument provides very strong efficiency motivation for CIT in Canada, especially when the disincentive effects on mature U.S. subsidiaries and Canadian-owned firms are taken into account.

The other reason we might want to levy CIT (other than the cash-flow version), even if we subscribed to a consumption tax approach, would be to improve the Canadian terms of trade. For example, the more foreign investment (especially portfolio investment) that occurs in Canada, the larger are the outflows of interest and dividends. Putting the argument crudely, these larger outflows require greater exports. If the elasticity of demand for our exports is finite, a deterioration in our terms of trade is implied. Thus there may be an optimal rate of CIT that will make the private cost of foreign capital in Canada equal the social cost (which includes the marginal terms-of-trade damage of increased foreign investment). However, this argument is of very recent origin and ignores the fact that there may be better ways to manipulate the terms of trade. This is an area where much more research is required.

For those who would advocate the UIT approach in a closed economy, bringing in the open economy introduces extra reasons why one might want to tax capital income and, in particular, levy CIT. While in the closed economy it would be possible, in principle, to do without CIT under the UIT approach, in the open economy it will likely be considered desirable as a withholding tax against foreigners.

6 Tax Treatment of Human Capital

In recent debate the implications of alternative capital income tax reforms for investment in human capital have received scant attention. This is a reflection of the general lack of research on the effects of taxation on human capital. The lack of work in this area is unfortunate. One of the few studies that has addressed the issues discussed here (Driffill and Rosen, 1983) finds that whether human capital investment is taken into account has a very large influence on the estimated welfare costs of stylized income and consumption tax systems. This influence, it is estimated, is much greater than that of taking labour/leisure choice into consideration.

The lack of research on tax effects on human capital investment probably reflects the difficulty of obtaining satisfactory results in empirical work in this area. There is after all no lack of available theory. In addition to the well-known conjectures of Boskin (1975), the considerable theoretical literature on human capital investment in the 1960s and 1970s makes possible a rich analysis of tax effects on human capital, as illustrated in this chapter. There is also widespread appreciation of the quantitative importance of human capital. Schultz (1962) estimated that 48 per cent of the capital stock of the United States in 1957 was in human form. More recently, Kendrick (1976) has put the figure at 69 per cent for 1969. Finally, Jorgenson and Pachon (1983) indicate a ratio as high as 96 per cent in the United States, when the value of human capital used in nonmarket activities (household production) is included.

This chapter has three main sections. The first two consider human capital investment when leisure is fixed; the third section makes leisure endogenous. The model of the first section, which uses a two-period analysis and makes some other simplifying assumptions, is presented largely for expositional purposes. The following section extends this simple model to the multiperiod case and relaxes other simplifying assumptions.

All three sections of the chapter sketch first the theory of the no-tax case. They then outline the impacts of pure wage, income, and expenditure taxes – both proportional and progressive. The effects of the Blueprints scheme of registered and nonregistered ("tax-prepaid") accounts, which combines pure wage and expenditure taxes in a manner discussed earlier in Chapter 3, are also discussed in each section.

Human Capital Investment with Exogenous Leisure – The Two-Period Model

The No-Tax Case

A simple version of the human capital theory assumes that: 1) the lifetime profile of leisure (i.e., time spent in "home production") is exogenous; 2) the only inputs in the human capital production function are an individual's "schooling time" and previously accumulated human capital; and 3) education and training do not have any "consumption component."[1] This set-up is sufficiently general that human capital accumulation may be viewed as occurring either in specialized institutions – schools, colleges, and universities – or on the job.

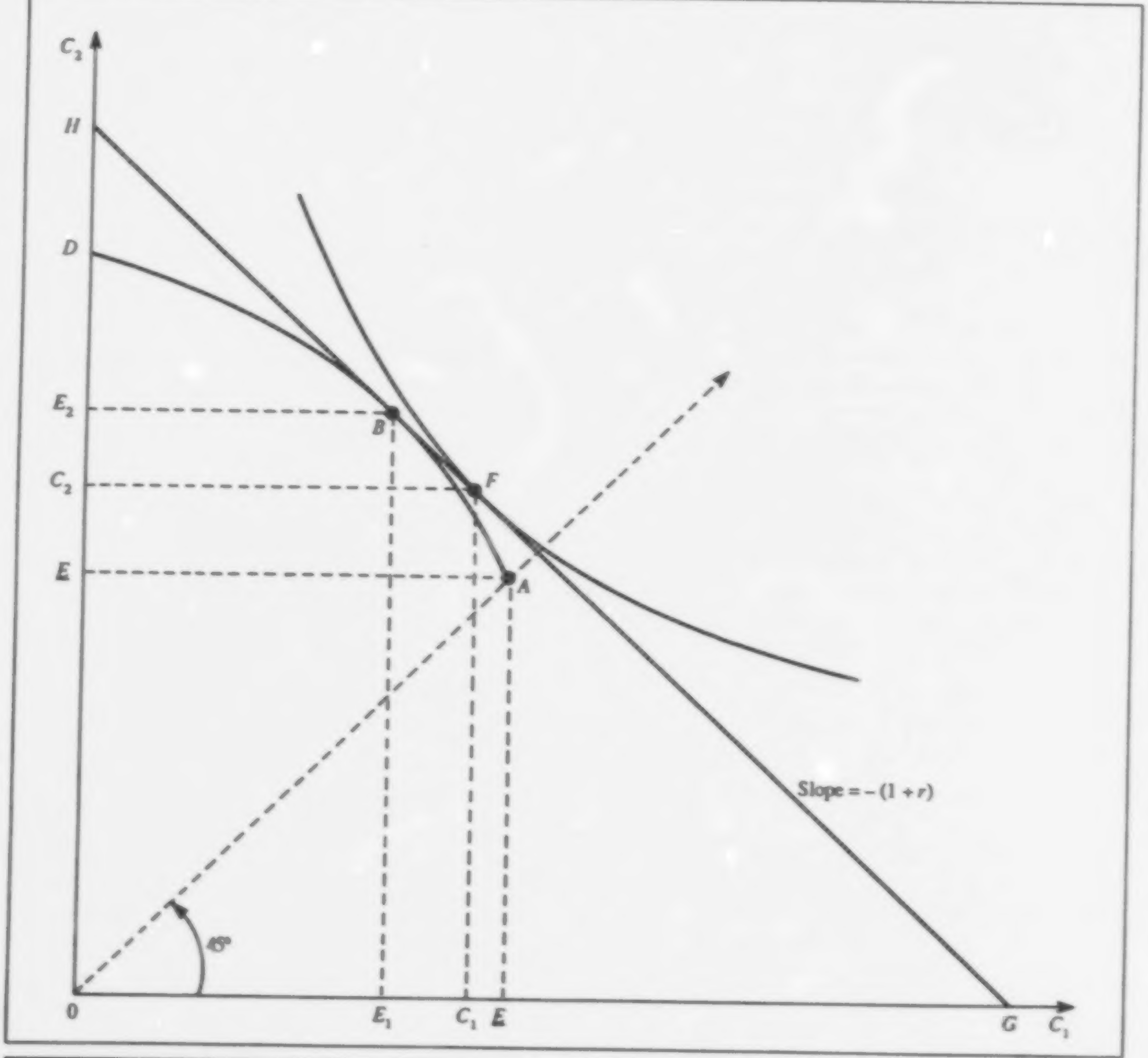
While the assumption of exogenous leisure time is "unrealistic," as discussed later in this chapter, the character of the analysis changes surprisingly little when it is relaxed. Some important new insights are gained, however. Similarly, although certain phenomena are excluded by assuming that human capital does not require purchased inputs (tuition, books, etc.), this assumption is not sufficiently unrealistic to make the analysis uninteresting. In fact, it is widely believed that the cost of one's own time – forgone earnings – is by far the major expense in human capital investment beyond the secondary level. Although the relationship is sensitive to unemployment rates, particularly for the young, purchased inputs ("direct costs") likely account for well less than half of the private costs of postsecondary education.[2]

In order to obtain a simple diagrammatic analysis we can consider, once again, a two-period model. This will contrast with that examined earlier in this study in allowing saving to occur in both human and nonhuman (financial or physical) form. Figure 6-1 illustrates the analysis.

On the assumption that human capital does not depreciate, that its rental rate is constant over time, and that leisure time is not only exogenous but fixed at a constant level, an individual who did not invest in human capital at all, instead devoting all nonleisure time to work, would earn the amount $\bar{E}$ in both first and second periods. This would provide the earnings stream indicated

Figure 6-1

Human Capital Investment and Saving – The No-Tax Case



by point *A* in Figure 6-1, which may be referred to as the individual's "endowment point."

In fact almost everyone engages in at least some human capital accumulation, so that earnings streams like that indicated by point *A* are seldom observed. By devoting some time to schooling in the first period the individual can increase his/her human capital, H_2, and raise earnings in the second period. (Note that no one will ever invest in human capital in the second period, since there is no remaining payoff period.) This will move observed earnings in the northwest direction from point *A*, along an earnings possibility locus like that shown in the diagram.

The slope of the earnings possibility locus has a simple interpretation. The reduction in earnings due to time spent in human capital accumulation in the first period, ΔE_1, represents (the negative of) investment in human capital. The return on this investment is the increase in second-period earnings, ΔE_2. Thus the rate of return on human capital investment, r_H, is just:

$$r_H = \frac{-\Delta E_2}{\Delta E_1} - 1. \tag{6.1}$$

In other words, the slope of the earnings possibility locus, $\Delta E_2/\Delta E_1$, equals $-(1 + r_H)$.

As Figure 6-1 is drawn, the slope of the earnings possibility locus (in absolute value) declines as more is invested. This reflects the common assumption that the rate of return to human capital investment declines as more investment takes place.[3] In order to explain the fact that most people engage in some voluntary human capital accumulation (i.e., schooling time does not immediately go to zero at the minimum school-leaving age), the rate of return on human capital, r_H, must initially exceed that on nonhuman capital, r. Otherwise, instead of investing in human capital from point *A*, the wealth-maximizing strategy would be to set schooling time to zero and do any desired saving in nonhuman form. An interior solution for first-period schooling time is found in cases, like that illustrated in the diagram, where r_H falls to r before the entire first period has been devoted to schooling.

To sum up, the solution to the consumer's problem illustrated in Figure 6-1 is to invest in human capital up to the point where its rate of return, r_H, falls to the rate of return on other assets. If further saving is desired, it is clearly efficient to do this via nonhuman assets – that is, to travel up the locus *GBH* from point *B*. It is also possible, of course, to move downward from point *B* by borrowing. With a common borrowing and lending rate, and no taxes, the individual faces a straight-line budget constraint *GBH*, along which the consumption plan can be located at any point. Very patient individuals will want a consumption path skewed even more towards the future than the earnings path – they will choose to move up from point *B*. Less patient individuals will want a steadier path of consumption than of earnings and will move down from point *B*. (The latter case is illustrated in the diagram.)

It is important to note that the analysis of consumption behaviour here changes from that provided in earlier chapters. This is because whereas in earlier chapters when interest rates changed the earnings path remained constant, here earnings will in general change. Thus, for example, an increase in the interest rate will *reduce* optimal human capital investment, providing additional reason to expect an increase in saving.[4]

One final point before we proceed with the tax analysis is that the above discussion, and the remainder of the chapter for the most part, considers only a world of certainty. Levhari and Weiss (1974) demonstrated that under certain plausible conditions, if the returns to human capital investment were risky but those to nonhuman capital were not, individuals would underinvest in human capital. This result may have some real-world significance since it is widely believed that the risk associated with human capital investment exceeds that of investment in the representative portfolio of nonhuman capital.

Wage Tax

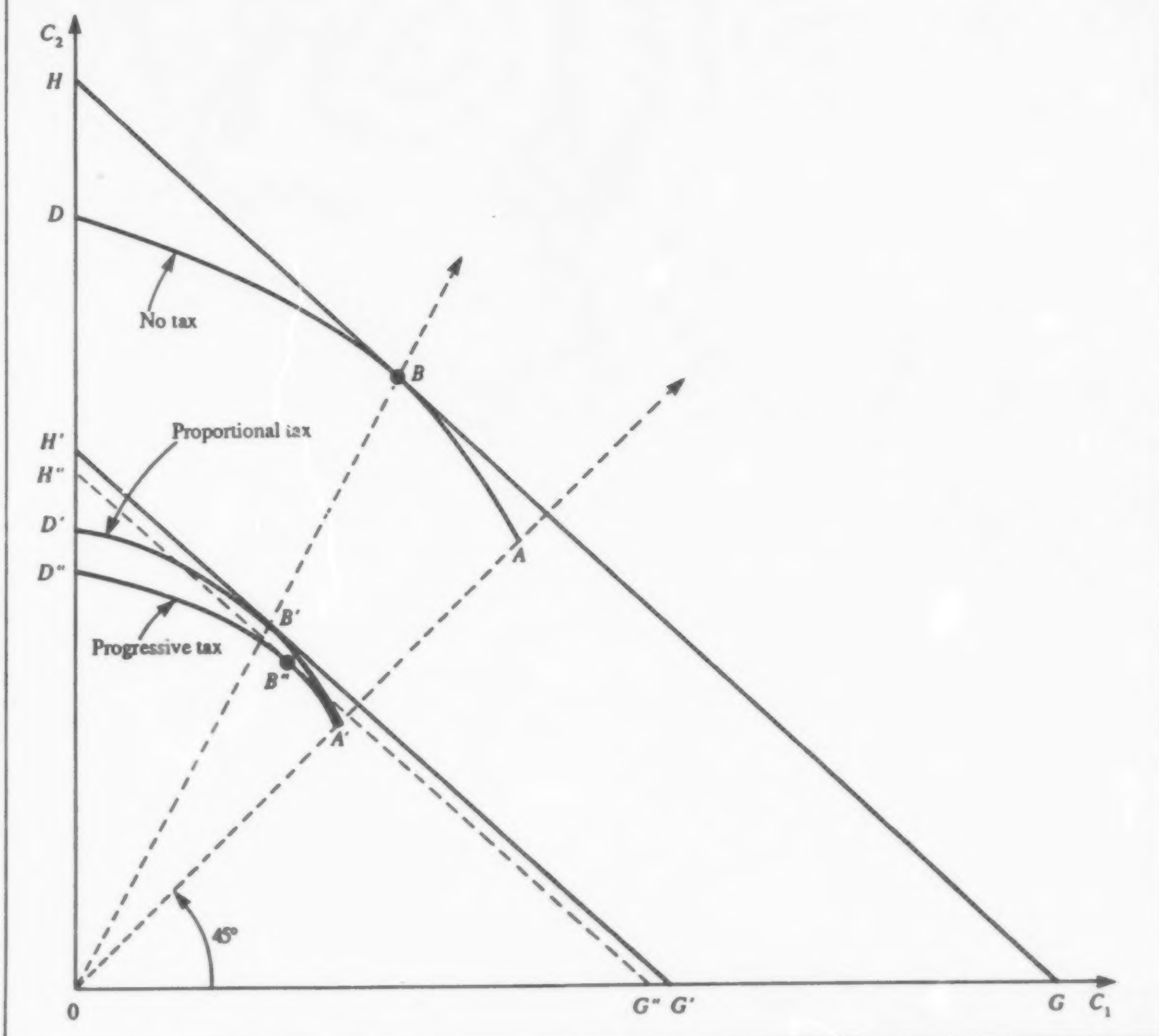
Although adoption of a pure wage tax seems unlikely, it provides a useful starting point in the present discussion. In its proportional form it is a lump-sum tax. Also, it provides a building block for the analysis of a comprehensive income tax and other schemes that will be considered later.

Figure 6-2 can be used to discuss the impacts of both proportional and progressive wage taxes on human capital formation and welfare. A proportional tax is particularly easy to deal with: the no-tax earnings possibility locus is simply "shrunk" towards the origin uniformly, producing a post-tax earnings possibility locus that has the same shape as the no-tax locus but is drawn on a smaller scale.[5] Each point on the post-tax locus corresponds to a point on the pre-tax locus, which lies on the same ray from the origin. Thus it is easy to see how much human capital investment is going on at any point on the post-tax locus: first locate the corresponding point on the pre-tax locus and read off the forgone earnings.[6] It is clear that human capital investment continues at the socially optimal level under a proportional wage tax.

The result that a proportional wage tax does not distort human capital investment, and is thus a lump-sum, is a consequence of the assumption that the only cost of investment is forgone earnings. Taking direct schooling costs into account as well, unless such costs are tax-deductible, the wage tax will reduce optimal human capital investment. Intuitively, when forgone earnings are the only cost, the tax system is nondistortionary since it reduces both the private costs and benefits of human capital investment by the tax rate, τ. If there are non-deductible direct costs, then part of schooling costs are not being subsidized. The private rate of return to human capital investment will fall below the social rate of return and suboptimal human capital investment will occur.

Figure 6-2

Human Capital Investment, with Proportional and Progressive Wage Taxes



A progressive wage tax produces a post-tax earnings possibility locus with a different shape from the pre-tax locus. In general, the slope of the post-tax locus is given by:

$$\text{Slope} = -(1 + r_H)\frac{(1 - \tau_2)}{(1 - \tau_1)}, \tag{6.2}$$

where τ_1 and τ_2 are marginal tax rates in periods 1 and 2, respectively.[7]

The slope of the post-tax locus starts off at point A' with the same slope as the pre-tax locus. (Since earnings equal E in both periods, with zero human capital investment, the slope of the post-tax locus is initially $-[1 + r_H]$.) But with a tax system in which marginal tax rates are increasing, the slope of the post-tax locus will sooner or later fall below that of the pre-tax locus, as τ_2 rises above τ_1.

There is no simple geometric procedure for finding the point on the pre-tax earnings possibility locus that corresponds with a particular point on the post-tax locus. However, it is unambiguous that less human capital investment will occur under the progressive tax than under the proportional tax, so that the former is distortionary and induces suboptimal human capital investment. For example, we know that less human capital investment is occurring at point B'' in Figure 6-2, under the progressive tax, than at point B', under the proportional tax, for the following reason. Since at point B'', $\tau_1 < \tau_2$, and

$$(1 + r_H)\frac{(1 - \tau_2)}{(1 - \tau_1)} = (1 + r),$$

r_H must exceed r. Since r_H falls monotonically with human capital investment, this means that less investment is occurring than at point B', where we know that $r_H = r$.

Income Tax

An income tax may be thought of as a combination of a wage tax and a tax on capital income. This is fortunate for present purposes since we only need to add an analysis of an interest income tax to transform the above discussion into one of a full income tax.

An interest income tax places a wedge between the social and private rates of return to nonhuman investment. With a constant proportional income tax at rate τ, the private rate of return becomes $\hat{r} = (1 - \tau)r < r$. Figure 6-3 shows how the new lower private rate of return will induce the individual to extend human capital accumulation beyond what would occur with zero interest income tax. (Privately optimal human capital accumulation results in the earnings path given by point B' instead of point B in the diagram.)

In the context of human capital accumulation, the component of a proportional income tax falling on interest income undoes the nondistortionary character of the wage tax element. However, under a *progressive* income tax, since the wage tax element induces too little human capital investment, the interest income tax works in the right direction. Some of the discouragement of human capital investment caused by the progressive wage tax can be offset by reducing the net private rate of interest and thereby inducing additional education and training.

It should be noted that in the important case where students seek to borrow to finance education this discussion assumes that their interest expense will be tax-deductible. If it is not, the interest income tax has no effect on human capital accumulation. This may imply that an interest income tax would encourage greater human capital accumulation primarily among older groups, perhaps principally in the form of greater on-the-job training. (Workers aged 25-40, for example, may face fairly high tax rates on marginal physical investments. This will make human capital accumulation more attractive for them than it otherwise would be.)

Finally, the neglect of uncertainty in the above analysis has an effect on the results. As noted earlier, Levhari and Weiss (1974) showed that if human capital investment is risky there may be a tendency for individuals to underinvest in this form. Hamilton (1982) shows that an income tax can be welfare-improving since its stimulus to human capital accumulation tends to counteract this underinvestment.

Expenditure Tax

In the model considered here, where labour/leisure choice is exogenous, a proportional expenditure tax alters an individual's opportunities in the same way as an equal present-value yield wage tax. Both systems simply appropriate a fraction τ of pre-tax lifetime earnings. The wealth-maximizing human capital accumulation plan is therefore clearly the same under either system.

A progressive annual expenditure tax is more interesting. It is analytically the same in its operation as a system where all saving must occur in registered accounts (see Chapter 3). Figure 6-4 illustrates the extension to the case of human capital accumulation.

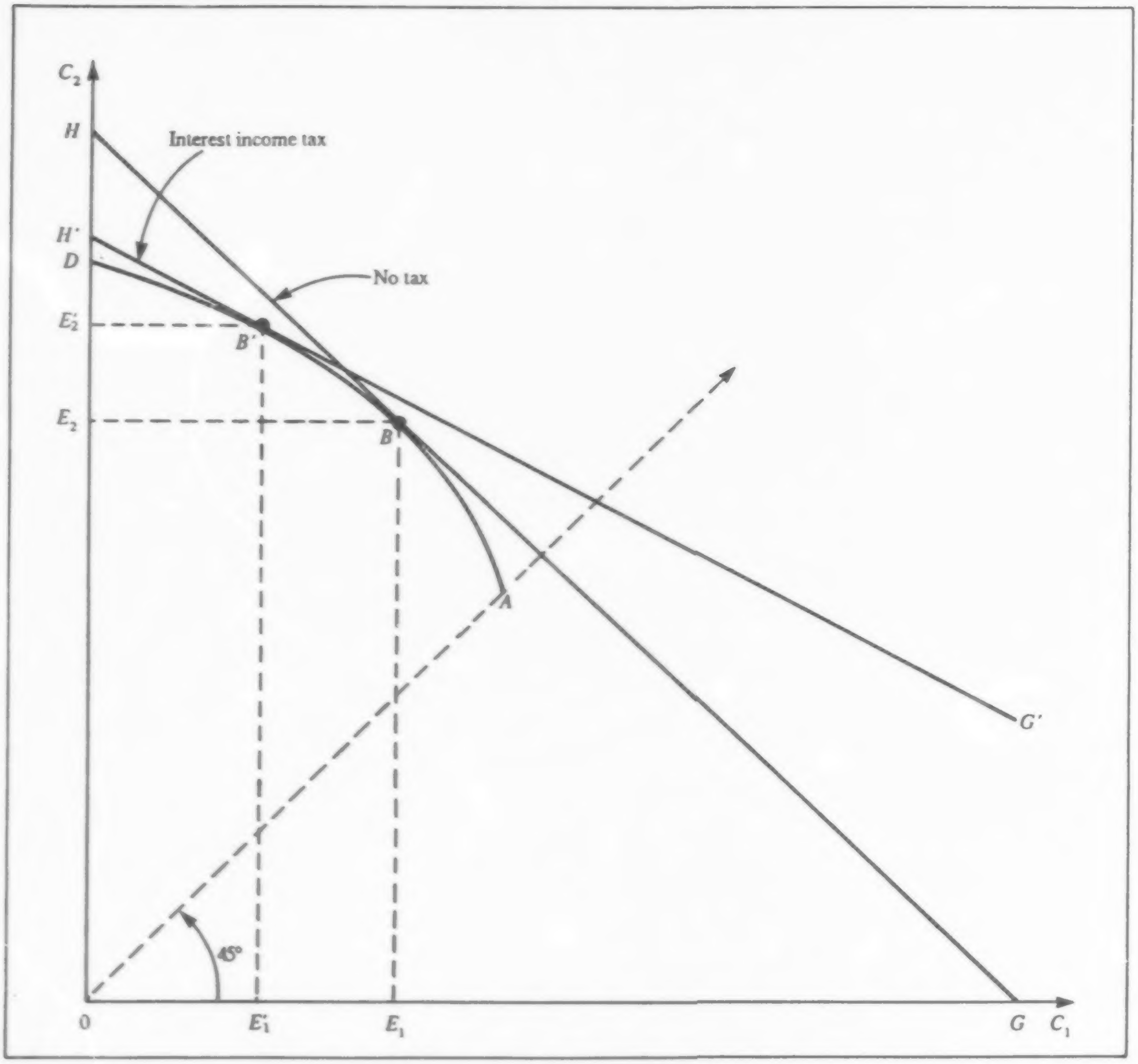
In the absence of any other form of saving, human capital accumulation would produce the concave post-tax consumption possibility locus illustrated in the diagram. This is, in fact, qualitatively the same as that drawn in the progressive wage tax case. The slope of the locus is, once again,[8]

$$-(1 + r_H)\frac{(1 - \tau_2)}{(1 - \tau_1)}.$$

However, the no-saving consumption possibility locus cannot be the end of the story. A full analysis will differ

Figure 6-3

Effects of Interest Income Tax on Human Capital Investment



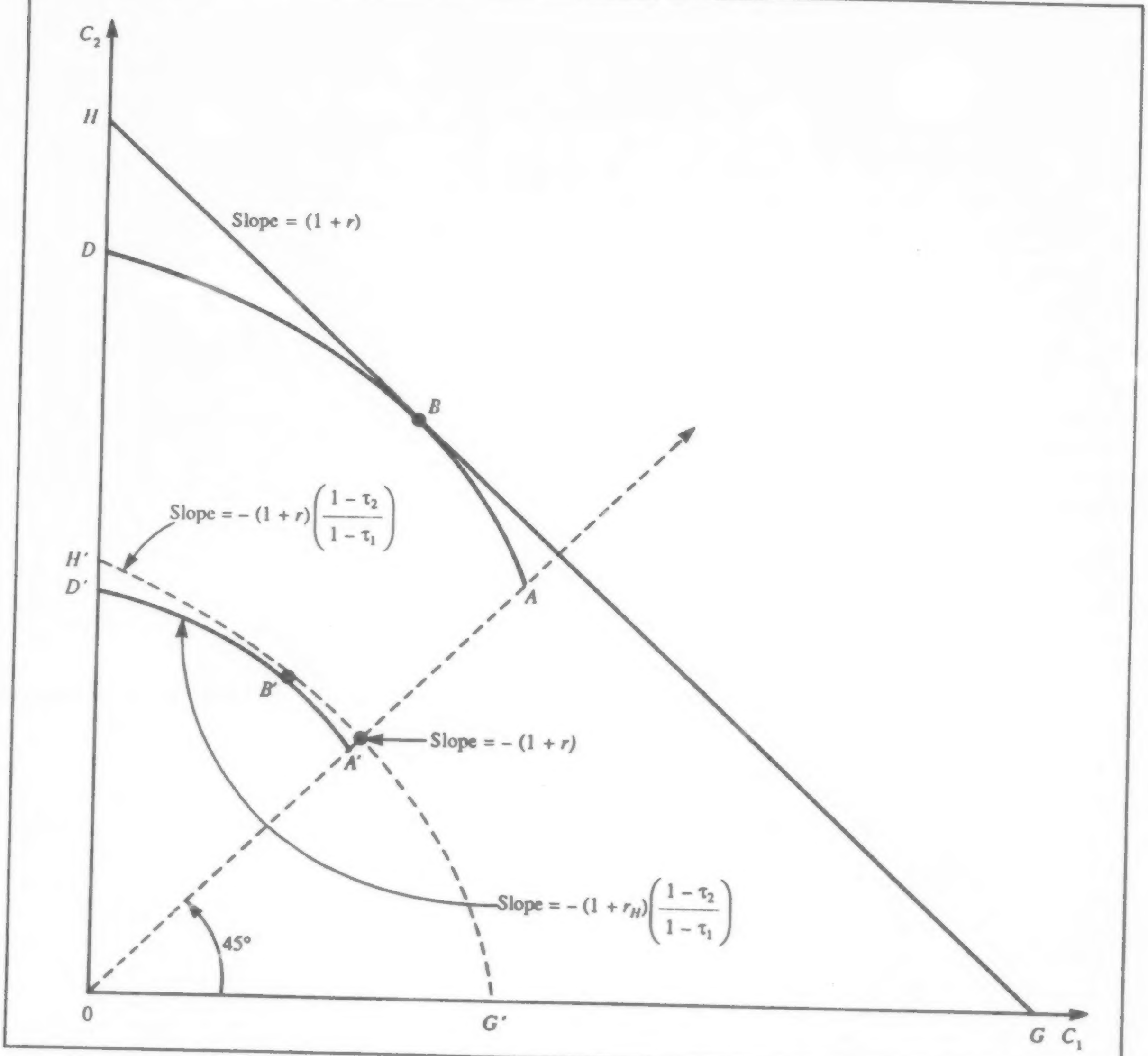
from the progressive wage tax case because tax liabilities in the two periods are affected by saving or dissaving in nonhuman form.

The key to understanding the optimal human capital accumulation plan in the progressive expenditure tax case is to note that the rate of return on nonhuman capital is affected in just the same way by taxation as that on human capital. Thus an extra $1 saved now costs only $(1-\tau_1)$, but the return in the second period is also lowered to $(1+r)(1-\tau_2)$. This implies that, in the optimum,

$$(1+r_H)\frac{(1-\tau_2)}{(1-\tau_1)} = (1+r)\frac{(1-\tau_2)}{(1-\tau_1)},$$

Figure 6-4

Effects of a Progressive Expenditure Tax on Human Capital Investment


C_2
H
Slope = (1 + r)
D
B
Slope = – (1 + r)$\left(\frac{1-\tau_2}{1-\tau_1}\right)$
H'
D'
A
B'
A'
Slope = – (1 + r)
Slope = – (1 + r_H)$\left(\frac{1-\tau_2}{1-\tau_1}\right)$
45°
0
G'
G C_1

or $r = r_H$, giving socially optimal human capital accumulation.

In terms of Figure 6-4, the wealth-maximizing strategy is to invest in human capital up until point B', where $r = r_H$. It is then possible to move above the no-saving consumption possibility locus, $A'B'D'$, by saving or borrowing along $G'B'H'$. (The latter is less concave than $A'B'D'$ since r, unlike r_H, is constant.)

In contrast to human capital investment, intertemporal consumption choice is distorted by the progressive expenditure tax. In Figure 6-4 we can see that this will generally be the case since it is only when there is a tangency between an indifference curve and $G'B'H'$ on the 45° line that the marginal rate of substitution between present and future consumption is equal to $-(1+r)$ as required for efficiency.[9] (Equality of the marginal rate of substitution and $-(1+r)$ on the 45° line, by definition, means that the "rate of time preference" equals the rate of interest.) With equilibrium above the 45° line, the slope of the effective budget constraint is less than $(1+r)$, in absolute value, so that there is a distortion that is qualitatively the same as that produced by taxing interest income (although it is likely typically less strong).

The Blueprints Scheme

The above discussion of progressive wage and consumption taxes reveals an interesting point: a progressive wage tax discourages human capital investment but does not distort intertemporal consumption choice, while a progressive expenditure tax does the opposite – it induces efficient human capital investment but distorts on the saving margin. The Blueprints scheme, which, as discussed in Chapter 3, allows an individual to opt for wage tax treatment in some cases and expenditure tax treatment in others, combines the best elements of each form of treatment. Under this scheme we obtain efficiency both in human capital investment and nonhuman saving.

Figure 6-5 illustrates the analysis of the Blueprints scheme. As in the progressive wage and consumption tax cases, the shape of the earnings opportunity locus is different than under proportional taxation. The individual will move up this locus until its tax-affected slope, $-(1+r_H)(1-\tau_2)/(1-\tau_1)$, equals that produced by the nonhuman investment opportunity locus. As under the progressive expenditure tax, the solution is to invest in human capital up until the point where $r_H = r$. It is then possible to lend or borrow via a registered account (which receives expenditure tax treatment), resulting in movement along the locus $G'EB'H'$, as in the progressive expenditure tax case. However, the option of saving in nonregistered form (which receives wage tax treatment) now affects how far one moves along $G'EB'H'$. In fact, there is a unique wealth-maximizing strategy. This is to *borrow* in registered form sufficiently to move along $G'EB'H'$ to point E, on the 45° line. At this point the net of tax interest cost of borrowing in registered form has risen to the pre-tax interest rate, r. It is optimal to do any further lending or borrowing in nonregistered form – that is to move up or down IEJ, as desired.

The outcome of this analysis is a demonstration that in a world of certainty and exogenous leisure time, the Blueprints scheme induces optimal human capital investment and does not distort intertemporal consumption choice. Human-capital investment occurs up to the point where its social rate of return, r_H, falls to the pre-tax rate of return on nonhuman investments; and saving is governed by a straight-line budget constraint with slope $-(1+r)$, as required to avoid intertemporal distortion.

It is important to note that these happy results under the Blueprints scheme depend on the possibility of (unlimited) borrowing in registered form. While governments might be expected to approve of provisions making this possible – such borrowing increases current tax burdens – the registered savings vehicles currently available in Canada and elsewhere do not permit net borrowing. Even if they did, however, it could be pointed out that students may often face difficulties in borrowing to finance their education (Merton, 1983). Thus student loans must be available, and borrowing in registered form must be possible, for the Blueprints scheme to avoid underinvestment in human capital.

Human Capital Investment with Exogenous Leisure – The Multiperiod Model

The No-Tax Case

While the two-period formulation of human capital investment decisions and relevant tax effects is revealing, it may appear to lack "realism." Some analysis of how the foregoing discussion would alter if we considered a realistic multiperiod lifetime is therefore appropriate. In addition, a richer technology of human capital production may also be considered.

In the simple two-period model sketched above we assumed that there were no "direct costs" of schooling. More generally, we may consider a production function for Q_t, gross additions to the human capital stock in year t, of the form:

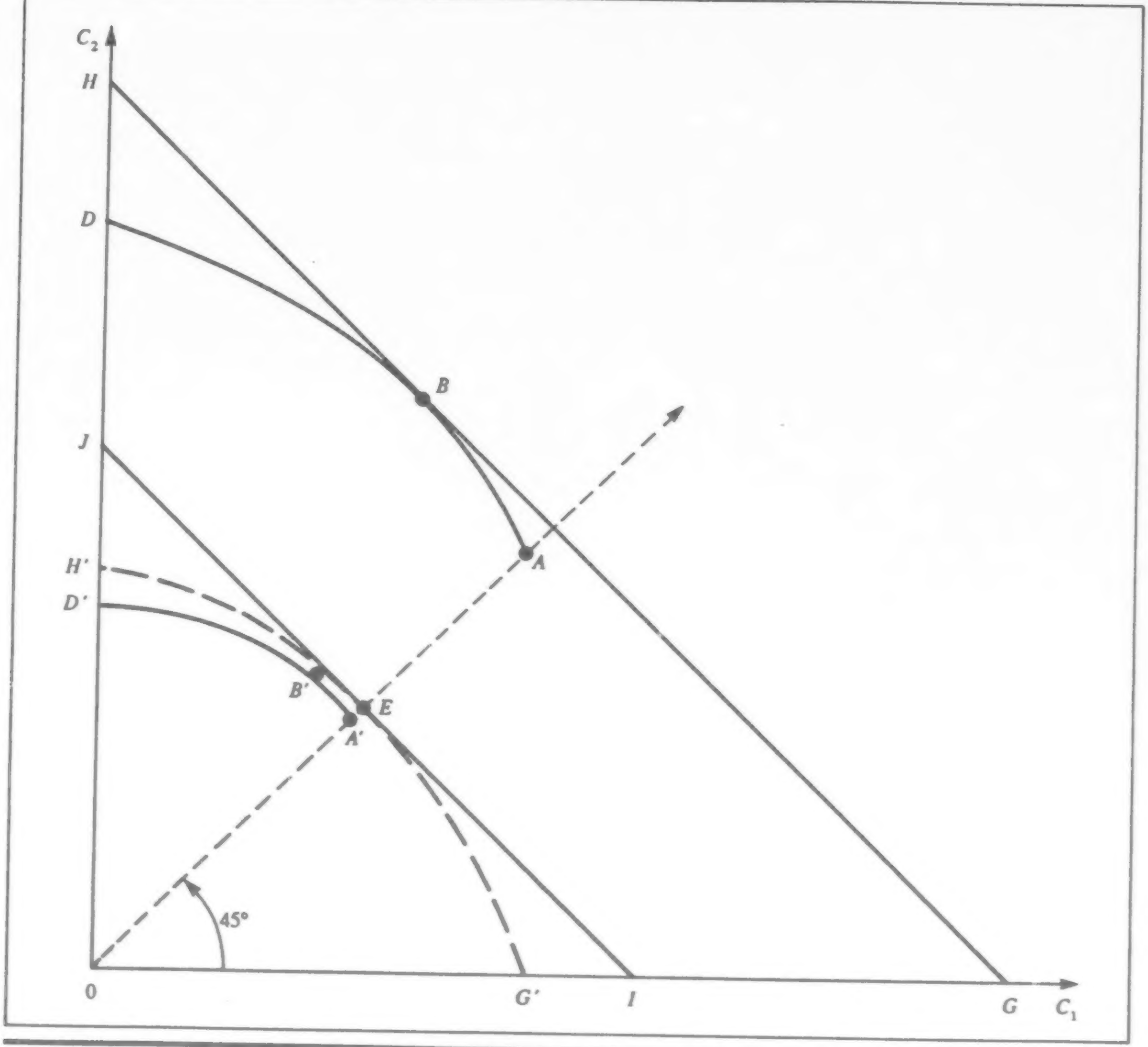
$$Q_t = Q(H_t, N_t', X_t'); Q_H, Q_N, Q_X \geq 0; Q_{HH}, Q_{NN}, Q_{XX} \leq 0,$$

where H_t, N_t', and X_t' are current values of human capital, time spent in schooling, and goods used in schooling, respectively. Note that diminishing returns to each input are assumed. (All second partial derivatives are negative.)

The implications of a wide variety of special versions of the production function Q have been considered in the literature. Purchased inputs, X_t', are sometimes ignored (as in the previous section), as is the possibility that H_t may be an important input into the construction of more human capital (as in the central case considered by Ghez and Becker, 1975). Also, special constraints may be

Figure 6-5

Effects of the Blueprints Scheme on Human Capital Investment



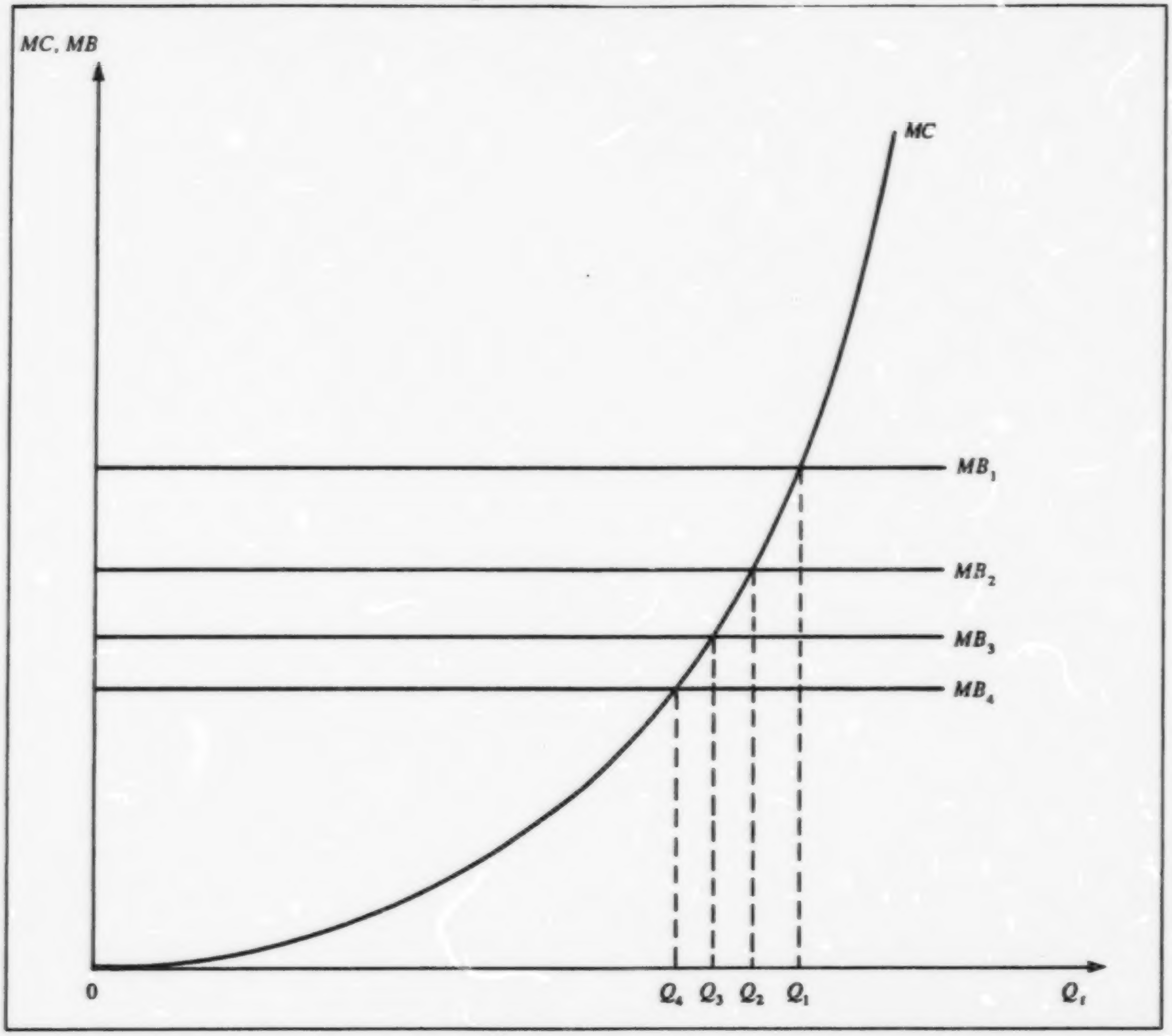
placed on the way in which the different inputs enter. Ben-Porath (1967), for example, in his path-breaking study used a Cobb-Douglas production function in which H_t and N_t' entered as a single term, $N_t'H_t$, reflecting a neutrality assumption that human capital increases the productivity of time equiproportionally in working and learning.

Provided that we do not drop N_t' from the production function, the character of the analysis will not change sufficiently to affect insights that are important here. These insights can therefore be obtained by focusing on the simple, but classic, Ben-Porath model.

Figure 6-6 presents the core of the Ben-Porath model diagrammatically. It illustrates the case where at least some time is spent working and makes assumptions similar to those of the previous section: a constant rate of interest r for both borrowing and lending and a fixed

Figure 6-6

The Ben-Porath Model of Human Capital Investment



earning lifetime of length T. Under the "neutrality" assumption referred to above, the cost function for producing human capital does not change over time, lending simplicity to the analysis. The cost function does not change because although the wage rate changes with age, altering the cost of schooling time, it is not time as such that enters the human capital production function. Since both the wage and effective time inputs, N'_tH_t, are proportional to human capital, the cost of effective time inputs does not change with the wage rate. Hence we obtain the single marginal cost curve for human capital production illustrated in the diagram. This is monotonically increasing with Q_t, as a result of the assumption of decreasing returns to scale.

In contrast to the marginal cost schedule, the marginal benefit of human capital accumulation is constant at a point in time no matter how much human capital is being produced, and declining with time. Thus marginal benefits shift down continually over the life cycle, sweeping out a succession of points along the marginal cost curve and dictating constantly falling optimal (gross) human capital accumulation.

The explanation of the properties of marginal benefits is as follows. At a point in time marginal benefit is constant since each unit increase in human capital raises the discounted value of the future earnings stream by the same amount. (Recall that future leisure time is fixed.) However, as time advances the pay-back period on any investment declines. Thus marginal benefit declines year by year.

Figure 6-6 shows the determinants of gross human capital investment in the Ben-Porath model. Since Ben-Porath assumes a constant rate of depreciation, the diagram does not immediately tell us how the human capital stock will be evolving. (It might appear from the diagram, for example, that since gross human capital accumulation is positive until the last period of life – due to the fact that marginal benefit is always positive, if small, and the marginal cost curve emanates from the origin – earnings must always be increasing.) Initially the force of accumulation will be much greater than that of depreciation, so that earnings will rise quite quickly. However, beyond some point depreciation will be the stronger force so that a reduction in wage rates towards the end of the working lifetime is predicted.[10]

Since the individual is steadily becoming more efficient in the production of human capital, the fact that gross additions should decline throughout indicates unambiguously that the time devoted to human capital accumulation should be declining. While this accords well with casual observation of the relative amount of time devoted to on-the-job training, it does not capture behaviour during the period of formal schooling very well. The amount of time spent in study by university students, for example, probably increases over their stay at university. Certainly, graduate students work longer and harder than undergraduates! A simple extension of the Figure 6-6 analysis goes some way to dealing with this problem, but a complete answer cannot really be provided in a model with fixed leisure time.

Figure 6-7 extends the analysis to the period of pure schooling. The latter is characterized by the use of all available time in learning rather than earning. In this situation inputs of own time, even in effective units, are fixed in any year, and the marginal cost of human capital accumulation will increase more rapidly than indicated in Figure 6-5. Thus, while marginal cost will coincide with the *MC* curve of Figure 6-6 (indicated as *MC**) as long as some time is still spent in earning, beyond that point it will rise more quickly. This gives rise to the *MC* curves for successive periods, MC_1, MC_2, MC_3, ..., indicated in the diagram. The short-run *MC* curves march out until they coincide with the long-run curve over the relevant range. This is because the steady accumulation of human capital increases the effective units of time available, so that a corner is reached on own-time inputs at higher and higher levels of human capital production.

As indicated by Figure 6-7 there can be a period of "formal schooling" over which intersection of marginal cost and marignal benefit curves takes place on the constrained portion of the *MC* curve, that is, where all time is being used in human capital accumulation and none in work. Note that over this period the output of human capital each year will be increasing. This characterization of pure schooling corresponds fairly well to what is observed. All that it misses is the possibility of an increase in the total time devoted to schooling and working – something which frequently appears to be observed in the later stages of formal education. This phenomenon can only be accommodated by making leisure time endogenous.

Tax Effects

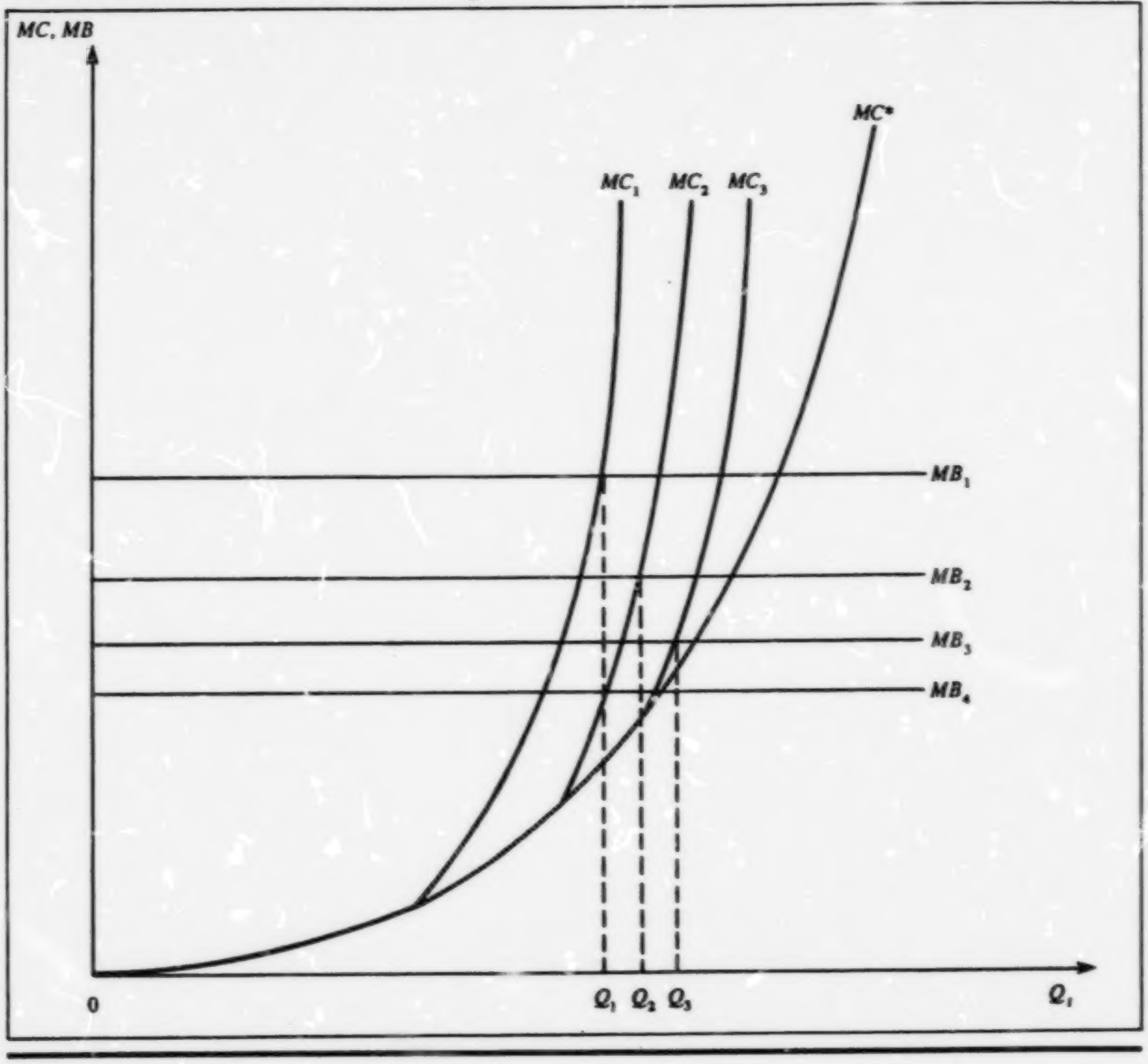
The discussion of tax effects in the two-period model in the first section carries forward with little modification in the multi-period model. It is still the case, for example, that a proportional wage tax is nondistortionary, if there are no purchased inputs in human capital accumulation or if such inputs are deductible. Such taxation reduces marginal costs and benefits equiproportionally, so that the optimal pattern of human capital investment will be unchanged.

A progressive wage tax will reduce marginal benefits more than marginal costs,[11] leading to a reduction in human capital accumulation. Note, however, that in the period of pure schooling all time will continue to be devoted to human capital accumulation, so that over the initial period it may make little difference whether wage taxes are proportional or progressive. The progressive tax will, however, shorten the period of complete specialization in human capital accumulation, so that its effect will be seen in people leaving formal schooling to enter employment too early.

Once again, income taxes distort human capital accumulation by reducing the relevant interest rate. (And, once more, this distortion may counteract that produced by a progressive wage tax, since it *encourages* human capital accumulation.) In the Ben-Porath diagrams this shows up in an upward shifting of all the *MB* curves, which, it must be recalled, represent the *discounted* value of increases in future earnings due to current investment.

Figure 6-7

The Ben-Porath Model: Pure-Schooling Case



Discounted value will, of course, increase in reaction to a decline in the discount rate.

A proportional expenditure tax is again nondistortionary when there are no direct schooling costs. Marginal benefits and costs are reduced equiproportionally as in the proportional wage tax case, since the net value of any wage payment falls as surely if tax is levied when those wages are used as when they are received. There may be a divergence between wage and expenditure tax impact, however, with direct costs of schooling. If these are treated as expenditure, their taxation will raise marginal costs relative to marginal benefits, discouraging human capital accumulation. However, if they are deductible, direct costs will be subsidized at the same rate as time costs, so that human capital accumulation will continue to be optimal, in contrast to the situation with wage taxes.

Once again, a progressive annual expenditure tax distorts saving decisions since it perturbs the private after-tax rate of return away from the no-tax interest rate. However, as in the two-period case, investment in human capital will not be affected by this feature. If the marginal rate of return on human capital investment, r_H, is not equal to the pre-tax rate of return on other assets, r, at all points, then it would pay to change the human capital investment plan. Thus, for example, if $r_H > r$, then more should be saved in human form and less in nonhuman form. The key here is that the tax distortion on the rate of return to saving is the same whether that saving occurs in human or nonhuman form. Thus it is always optimal to ensure that the rates of return on both human and nonhuman capital are the same. This contrasts with the situation under an income tax where taxation of interest income distorts the rate of return to nonhuman capital accumulation but not that to human capital accumulation.

Finally, the Blueprints system again combines the best of progressive wage and consumption taxation. As outlined in Chapter 3, the scheme leads to an effective progressive tax on lifetime earnings. Thus it does not distort human capital accumulation: the wealth-maximizing human capital accumulation plan will also maximize net lifetime earnings under this form of taxation. Access to the nonregistered form of saving or borrowing ensures, in addition, that there will be no distortion in intertemporal consumption choice.

Human Capital Investment with Endogenous Labour Supply – The Multiperiod Model

The No-Tax Case

Making leisure endogenous complicates the analysis of the previous section somewhat, but it leaves the essential results little changed.

With leisure endogenous, in any period an individual may spend time working, N_t, learning, N_t', or in the household, L_t. Purchased goods may be used either in household production, X_t, or in the production of human capital, X_t'. In general, the profitability of human capital accumulation is affected by future plans concerning the allocation of time between the household and market sectors. Still, human capital accumulation represents investment and is governed by the impetus to equalize the after-tax rates of return to investment in all forms, as it was in the fixed leisure case.

Given that net investment in human capital is at first positive, but beyond some age becomes negative, and assuming the rental rate on human capital is fixed, the wage rate will display the hump-shaped age-profile shown in the first panel of Figure 6-8. With this profile there will be substitution in household production away from the use of time, towards purchased inputs when the wage is high and the opposite when it is low. This substitution creates a tendency for leisure time to be lowest in middle age, an effect reinforced by substitution away from household production in periods when it is relatively more expensive towards production in other periods. (The time costs of producing commodities – meals, entertainment, etc. – in the home must be reckoned as well as the direct pecuniary costs.) Thus we expect a U-shaped profile for leisure time, L_t, over the life cycle, as illustrated in the bottom panel of Figure 6-8.

The hump-shaped wage profile also means that until middle age each year will see more substitution away from one's own time towards the use of other inputs in the production of human capital. This might suggest a U-shaped profile for schooling time, N_t'. However, one must also bear in mind that the declining pay-back period makes it likely that optimal human capital production will be decreasing after formal schooling is terminated. Up until middle age this will reinforce the tendency for N_t' to decline on account of substitution between inputs in human capital production, and beyond that stage it will likely swamp the input-substitution effect to produce continuing decline in N_t'.

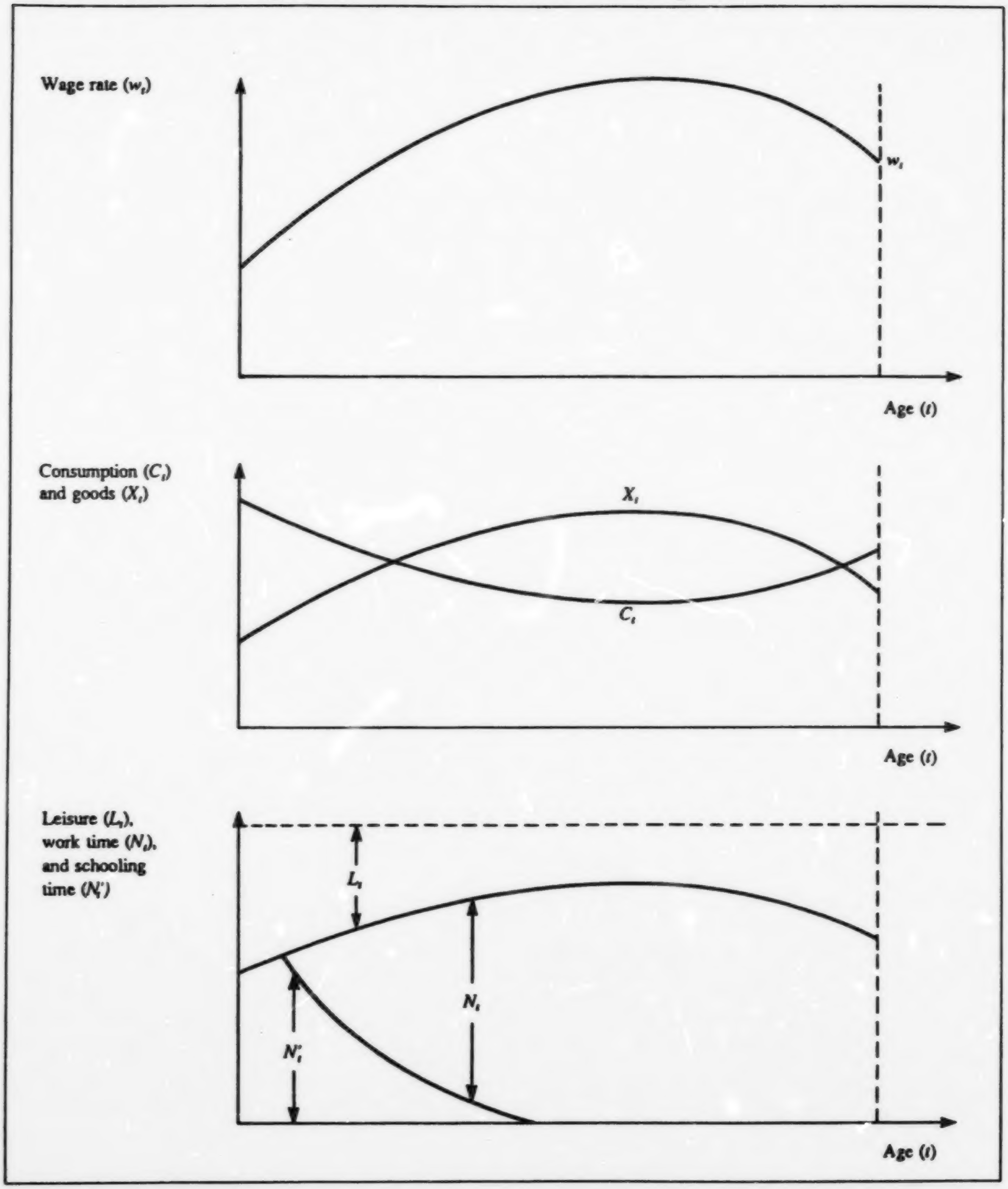
Finally, as Ghez and Becker (1975) demonstrate, if there is more ease of substitution between inputs in household production than there is between consumption of household outputs at different points in time,[12] then the U-shaped profile for household consumption, C_t, over the lifetime, induced by the hump-shaped profile of wages, will be accompanied by a hump-shaped profile for consumer purchases, X_t (see the middle panel of Figure 6-8). Such a profile for consumer expenditure agrees with what is observed. (See, for example, Hamermesh [1984], who finds that expenditure declines significantly in the later portion of the lifetime.)

Lump-Sum Tax

In contrast to the case where leisure is fixed, lump-sum taxation will not leave the human capital investment plan unaltered when leisure is endogenous. To see this, assume that both goods and leisure are normal in all periods. Then a lump-sum tax – which imposes an unavoidable tax obligation at some point in the lifetime but does not change any of the relevant prices – will induce a reduction in the consumption of goods and leisure in all periods. These changes may affect the optimal path of human capital considerably.[13]

Figure 6-8

Lifetime Patterns of Wages, Leisure, Work Time, and Schooling Time



A reduction in leisure time throughout life will not affect the marginal cost curve in the Ben-Porath diagram. However, *ceteris paribus*, it will increase the marginal benefit to accumulating an extra unit of human capital at any point. (The increase in future earnings will be greater because of lengthier future work times.) Thus lump-sum taxation will induce an unambiguous increase in human capital investment.[14]

Note that with purchases of goods lower at each point in the lifetime, and human capital accumulation higher, the importance of saving to provide for future consumer expenditures will be reduced under lump-sum taxation. This suggests important general equilibrium effects of a lump-sum tax, especially in a closed economy.

Wage Tax

In contrast to the case where leisure is fixed, all the taxes we consider here are now distortionary. All have a tendency to induce too much leisure time (relative to a lump-sum tax) since leisure is always an untaxed commodity. Some of the options contain features, however, which mitigate this distortion.

A proportional wage tax induces the use of an inappropriately time-intensive technology in household production at every point in the life cycle.[15] This distortion in turn results in a change in the human capital accumulation plan from what would be observed under a lump-sum tax, compounding the distortion. Although a proportional wage tax does not affect the rate of return (in the absence of purchased inputs) with leisure fixed, when it induces a reduction in the time available for learning or earning it also must reduce the rate of return to human investment. In terms of the Ben-Porath diagrams considered earlier, the marginal cost and marginal benefit schedules will shift down equiproportionally as long as leisure is fixed (in the absence of purchased inputs), but the downward shift in the marginal benefit curves will be greater when it is not.

Again, a progressive wage tax will discourage human capital investment relative to a proportional tax. However, with endogenous leisure this effect is stronger than with fixed leisure. With progessivity there will be especially large substitution towards the use of time in the household during the high-wage middle years, an effect reinforced by intertemporal substitution towards household production in high-wage years (since the progressive wage tax reduces the relative cost of such production compared to that in low-wage years). Hence a progressive wage tax depresses the rate of return on human capital even more when leisure is endogenous by increasing leisure time most in just those years when the payoff from investment in human capital is largest.

Income Tax

As in the fixed leisure case, an income tax tends to encourage human capital accumulation because the latter is, in the optimum, pushed to the point where the after-tax rates of return on the two forms of investment are equalized. (In terms of the Ben-Porath analysis, the income tax increases marginal benefits by lowering the discount rate applied to future earnings increments.)

An additional effect of the income tax is to make earlier consumption more attractive. With both goods and leisure normal in household production, this should lead to an earlier trough in leisure time (and an earlier hump in consumer expenditure). The effect of this altered time path of leisure on human capital investment is not, however, entirely clear. For very early investment, an earlier trough for leisure might reduce the marginal benefit from human capital formation, especially for high values of the discount rate. The decrease in projected work time in the near future could depress returns more than the increase in work time later increases them. However, for later human capital investment (e.g., via on-the-job training), or with lower discount rates, the opposite could occur. Earlier school-leaving, combined with a less rapid tailing-off of on-the-job training, would be predicted (at least for sufficiently high discount rates).[16]

As in the fixed leisure case, the income tax counteracts the impact of a progressive wage tax on the pattern of human capital accumulation to some (unknown) extent. Thus it is not clear whether human capital accumulation is encouraged or discouraged by a progressive income tax relative to a lump-sum tax.

Expenditure Tax

As in the fixed leisure case, an expenditure tax, whether proportional or progressive, treats investments in human and nonhuman form symmetrically. Thus investment in human capital will take place up until the point where its rate of return falls to that on nonhuman capital, on a pre-tax basis. However, while in the fixed leisure case this implied that human capital investment would be optimal, the same is not implied with endogenous leisure. Distortions in the time path of leisure over the life cycle have an impact on human capital accumulation, as in the above discussion of wage and income taxes.

The impact of proportional expenditure taxes on the lifetime leisure plan is of course the same as that of proportional wage taxes. In every period there is substitution towards more time-intensive household production. The result is an induced reduction in human capital investment.

A progressive expenditure tax differs from a progressive wage tax in likely increasing the relative cost of household production in high-wage periods. In the Cobb-Douglas case, for example, where the share of goods and time in household production costs is constant over the lifetime, a progressive consumption tax will raise the cost of goods more, proportionally, in higher-wage periods if the time path of goods inputs is hump-shaped (and peaks at the same age as the wage rate).[17] In this case at least, then, there will be substitution *away* from household production in high-wage periods. The major effect of this substitution would be to make human capital investment more attractive: less household output in high-wage periods implies less leisure and more labour supply, increasing the rate of return to (marginal benefits of) human capital accumulation. Thus the depressing effect on human capital accumulation of the general substitution away from goods towards time in household production may be partially offset by intertemporal substitution effects under a progressive consumption tax.

The Blueprints Scheme

Like the consumption tax, the Blueprints scheme provides symmetric treatment for human and nonhuman assets and, therefore, does not distort on the *interasset* margin. In the privately optimal plan the pre-tax rates of return on the two major forms of investment will always be equated. However, it remains the case that the lifetime leisure plan will be distorted, leading to an effect on human capital accumulation relative to what would be observed with lump-sum taxes.

As discussed earlier, under the Blueprints scheme the personal income tax is transformed into a progressive tax on lifetime earnings. A consequence is that the effective marginal tax rates on earnings are equal in all time periods. This implies that the impact of the Blueprints scheme on leisure is the same as that of a proportional wage tax: there is a general substitution towards the use of too much time in household production, which leads to a general reduction in hours of work over the lifetime and in human capital formation. There may also be intertemporal substitution effects in consumption, if the share of time in total costs of household production varies over the life cycle. However, at least in the Cobb-Douglas case, these effects are absent.

This analysis is interesting since it indicates that in combining progressive wage and consumption tax treatment for different assets (unregistered and registered, respectively), the Blueprints scheme wipes out the impact of progressivity on the lifetime leisure path. Relative to the wage tax, where progressivity induces an even greater reduction in labour supply in high-wage periods than obtained simply from a proportional tax, this is likely an advantage. The Blueprints scheme probably discourages human capital accumulation less than the progressive annual wage tax. However, relative to a progressive expenditure tax, this may be a disadvantage. The element of progressivity in the annual expenditure tax was predicted to counteract the reduction in labour supply in the high-wage middle years of the lifetime, offsetting to some extent the reduction in human capital formation caused by a proportional tax.

While the Blueprints scheme is a winner relative to an annual expenditure tax in eliminating completely the wedge between pre- and post-tax rates of return on all forms of investment, in the light of the current analysis it is not clear that it will necessarily win out in the efficiency stakes. The possibility, under a progressive expenditure tax, of reduced distortions on the labour/leisure and human capital investment fronts, due to offsetting distortions, raises the possibility that the excess burden of a progressive expenditure tax may be less than of the Blueprints scheme. This is a question that cannot be resolved without explicit modeling. Although, as sketched in the next section, there has been some modeling of income and expenditure taxes with endogenous leisure and human capital, this has not so far been extended to deal with the Blueprints scheme.

Empirical Evidence

As mentioned earlier at several points, there is only one study of the impacts of proportional income and consumption taxes in a multi-period model with endogenous human capital and leisure of which we are aware. Driffill and Rosen (1983) have performed a set of simulations under these assumptions that provide interesting insights, entirely consistent with the foregoing analysis. Clearly, although this work is useful, until further research is undertaken our understanding of likely real-world effects is highly tentative.

As outlined in Chapter 4, Driffill and Rosen use a partial equilibrium model in which interest rates and wage rates are exogenous. They model first the excess burden of a proportional income tax, and then compare the excess burdens of income and expenditure taxes.

Driffill and Rosen find that the excess burden of an income tax at 10 per cent is relatively small with human capital investment fixed – just 5.2 per cent of tax revenue in a central case. However, with human capital as well as labour supply endogenous, the excess burden rises to 34.8 per cent of tax revenue. The error that is made by forcing human capital to be fixed is much more severe than that produced by making labour supply exogenous. With labour supply fixed, excess burden would still be 26.1 per cent of tax revenue.

The explanation of the large impact on calculated excess burden of making human capital investment endogenous in the work of Driffill and Rosen lies largely in the distortion introduced in the rate of discount. The drop in the relevant discount rate induces an increase in human capital accumulation. That the discounting effect dominates is shown by the fact that when labour supply is fixed we get an excess burden equal to 26 per cent of tax revenue, not too far short of the 35 per cent burden with labour supply also variable. The impact of the wage tax component of the income tax in inducing too much leisure is relatively small in comparison. The size of this latter impact can be judged by the 5 per cent excess burden in the human capital fixed case, or the difference between the 26 and 35 per cent gains when we add endogenous labour supply to the version of the model with human capital endogenous.[18]

Finally, note that the Driffill and Rosen results need to be viewed in the context of at least two qualifications. As we saw earlier, the stimulus to human capital accumulation provided by the tax on interest under an income tax is likely welfare-improving up to a point. This is because there is a tendency for underinvestment in human capital due to the progressivity of the component of the income tax falling on wages, and there may be a similar tendency due to the possibly greater riskiness of investment in human than nonhuman capital.

Summary

This chapter has analysed the efficiency effects of both proportional and progressive wage, income, and expenditure taxes, as well as of the Blueprints scheme, which combines progressive wage and expenditure taxes, in the context of endogenous human capital. This analysis has been carried out both with and without endogenous leisure. Finally, the single relevant applied study – Driffill and Rosen (1983) – has been examined.

With leisure fixed, human capital investment remains at the socially optimal level under proportional wage taxes, proportional or progressive expenditure taxes, and under the Blueprints scheme. A progressive wage tax will generally induce suboptimal human capital accumulation, since it reduces marginal benefits more than marginal costs of investment. Finally, an income tax will encourage greater human capital investment by reducing the after-tax rate of interest, which is used to discount the benefits of human capital investment in the form of increased future earnings. The latter effect may be welfare-improving if not too strong, both because it will offset underinvestment in human capital due to the progressivity of the component of the income tax falling on wages, as well as possible underinvestment due to the often-claimed greater riskiness of investment in human than nonhuman capital.

With leisure endogenous, all the taxes considered have a basic tendency to induce suboptimal human capital investment, since they all lead to a substitution of greater home time for less goods inputs in household production throughout the lifetime. Thus with endogenous leisure, distortion in the *quantity* dimension of labour supply (fewer hours of work compared with the lump-sum tax case) is reinforced by a distortion in the *quality* dimension (human capital formation).

In addition to their main effect of inducing too much leisure and too little human capital investment throughout the lifetime, the taxes considered may all distort the intertemporal profile of household production. (These effects are most serious under the progressive wage and expenditure taxes, or under any interest income tax.) Each such distortion alters the lifetime leisure profile, which has an impact on the human capital accumulation plan.

One applied study of tax effects on human capital accumulation in the context of endogenous leisure (Driffill and Rosen, 1983) suggests that the excess burden of a proportional expenditure tax would be negligible, while that of a proportional income tax would be very large. The explanation is mostly that the interest income tax element of the income tax induces too much human capital accumulation. These results are clearly qualified by the point, made above, that a stimulus to human capital may be required, up to a point, to offset the effects of progressivity and uncertainty in reducing human capital investment.

Since in Canada interest on student loans is not deductible, an income tax will not artificially stimulate debt-financed human capital investment. The possible relevance of the Driffill and Rosen effect, therefore, likely lies with on-the-job training and other human capital investment by those in the, say, 25-45 age group, whose return on nonhuman investment is depressed by capital income taxation. Given the importance of tax shelters, the light taxation of capital gains, and the low effective rate of corporate income taxation, the strength of the effects, even for this older group, is not clear.

Finally, for a complete assessment, we must clearly set the Driffill and Rosen effect against the discouraging effects on human capital investment of rising marginal tax rates, and the possibly greater riskiness of human than nonhuman capital, as well as the *encouraging* effect of the large subsidies to education outside the tax system. It is difficult to assess the likely net outcome of these various forces. However, for the tax system alone, in our view, human capital investment is likely discouraged – relative both to a hypothetical lump-sum tax and to a consumption tax system along the Blueprints lines. The interest rate effect, as discussed above, is likely not strong in Canada except for some of the older, established members of the labour force. On the other hand, the discouraging effects of rising marginal tax rates, and the expansion of leisure time (relative to a lump-sum tax) over the lifetime, are clearly operative.

Conclusion

This chapter has demonstrated that, in a world of certainty, the Blueprints-style consumption tax reform explored in earlier chapters would not distort the allocation of capital between human and nonhuman forms, while a proportional income tax would induce a misallocation towards human investment and away from nonhuman investment. There is one applied study that suggests that the latter effects could be sizable. However, the *progressivity* of the current income tax system discourages human capital investment, and there is reason to doubt the significance of the stimulative aspects of income taxes with respect to education and training, especially for young people, in Canada. Therefore, we conclude that the current income tax system likely discourages human capital investment compared to what would be observed under a more neutral, consumption tax system. Further analysis and research, taking explicit account of the effects of uncertainty is clearly required, however.

7 Distributional Effects of Capital Income Tax Reform

The purpose of this chapter is to discuss the distributional impact of the two main tax reform options examined in this study: uniform income tax and consumption tax. UIT is an annual tax, whereas the intent of CT, which implements the Blueprints scheme of registered and non-registered accounts, is to tax lifetime consumption (which may, or may not, include bequests).

In addition to looking at the impacts of UIT and CT, we also examine the distributional effects of a tax on lifetime wages. For completeness we also compare UIT impacts with those of a progressive annual wage tax (WT) and an annual expenditure tax (ET).

There are a variety of possible frameworks for incidence analysis. The investigation can limit itself to "impact" effects; induced changes in economic behaviour and their feedbacks can be ignored. Alternatively, the distributional effects of transition to a new steady state and the change between initial and final steady states can be examined. Impact, transitional, and steady-state effects can be summed up by looking at either annual or lifetime income distributions. Finally, the distribution of income between population subgroups – age cohorts and investors in different assets – can also be examined.

Unfortunately, much popular discussion is limited to the least satisfactory level of analysis: the examination of impact effects on the annual distribution of income. The first section looks at this level of analysis. The discussion of impact effects is carried forward in the second section, where the initial effect on the lifetime distribution of income is examined. The third section looks at the redistribution between age cohorts and investors in assets of different kinds during the transition to a new steady state. Steady-state distributional effects are discussed in the fourth section.

Impact Incidence – Annual Income Distribution

In popular discussion the distributional effects of tax reform are often discussed on the implicit assumption of zero economic effects. Thus, for example, a switch to ET would be seen as necessarily benefiting the rich and harming the poor since consumption expenditure declines relative to currently taxable income as income rises. A similar assessment of the effects of simply omitting capital income from tax (the WT approach) could obviously be made.

At this crude level of analysis a move from the current tax base towards UIT will appear to increase progressivity, while a move to WT or ET would do the opposite, *given* zero change in the tax schedule. Even in studies at this level of analysis it is recognized, however, that this is not very interesting since revenues are not being held constant. In UIT reform we can afford to reduce tax rates,[1] while in ET or WT reform they must be increased to hold aggregate tax collections constant.

Since it is necessary to alter tax schedules to perform an equal-yield comparison under the alternative tax reforms, the distributional effect of each reform in simple impact analysis depends entirely on the change in tax schedule. *Any* desired distribution of the tax burden across income classes can be obtained using either uniform income, expenditure, or wages as the tax base.[2] Table 7-1 illustrates this with a simple example.

Table 7-1 shows a case where initially income is subject to a $5,000 zero rate bracket, a tax at 20 per cent on income between $5,000 and $50,000, and a marginal rate of 50 per cent for income over $50,000. This produces the distribution of tax burdens in the third row of the table. If we switched to an expenditure tax, keeping the same rates and brackets,[3] A's burden would not change since his/her consumption equals his income, but B's burden would go down by $1,000 and C's burden would drop by $17,500 – that is, approximately in half. Overall tax collections would have fallen from $42,000 to $23,500. To prevent this drop in revenue all marginal rates could be increased by a uniform amount – here an increase of 19.47 per cent is needed. The result is the distribution of tax burdens shown in the fifth row, where the poorest individual, A, pays $5,921 in tax, that is about 30 per cent of his income compared to 15 per cent under the income tax. In contrast, C's overall tax rate falls from 34.0 to 28.2 per cent (on income of $100,000).

If it was necessary under ET to go from the row three to row five situation in Table 7-1, this tax reform would be disequalizing. But, if we are willing to change tax brackets, exemptions, and marginal rates, we can achieve *any* desired distribution of tax burdens across the income

Table 7-1

Income, Expenditure, and Alternative Tax Burdens in a Single Tax Year (Illustrative Example)

	Taxpayer			
	A	B	C	Total
		(Dollars)		
Assessed income	20,000	30,000	100,000	150,000
Expenditure + direct tax	20,000	25,000	65,000	110,000
Tax burdens				
Initial rates[1]				
Income tax	3,000	5,000	34,000	42,000
Expenditure tax	3,000	4,000	16,500	23,500
Expenditure tax with initial tax rates + 19.47 per cent[2]	5,921	7,895	28,184	42,000
Expenditure tax with new tax brackets and rates[3]	3,000	5,000	34,000	42,000

1 Zero rate bracket = $5,000; tax = 20 per cent on income up to $50,000 and 50 per cent on income over $50,000. (Same rates and brackets apply when income is replaced by expenditure.)

2 Same rates and brackets as above except that both the 20 and 50 per cent marginal rates are increased by 19.47 percentage points – i.e., to 39.47 and 69.47 per cent, respectively. Rates are on a tax-inclusive basis.

3 Zero rate bracket = $12,500; tax = 40 per cent on (tax-inclusive) expenditure up to $30,000 and 77.1 per cent on expenditure over $30,000.

classes. Thus, for example, in the table we see in the final row that the original distribution of tax burdens can be restored under ET simply by raising the zero rate bracket to $12,500 and adopting marginal tax rates of 40.0 and 77.1 per cent on consumption up to $30,000 and over $30,000, respectively.

An idea of the change in distribution of tax burdens that would actually occur if we implemented UIT, ET, or WT reform without appropriately altering tax rates and brackets can be obtained from Tables 7-2 and 7-3. Table 7-2 shows the relationship between income assessed for tax purposes in 1972 for Canadian households arranged by income classes and their true economic income, consumer expenditure, and noncapital income (economic income minus capital income). Table 7-3 indicates average tax rates by income group under crude ET and WT reforms.

Table 7-2 shows that consumption expenditure ranges from 121 per cent of assessed income for the bottom-income group down to just 54 per cent for the highest group. This means that under a pure annual ET reform the tax base for the bottom-income groups would more than double relative to that for the top group, given the income tax in force in 1972. A considerable alteration in rates, brackets, and exemptions would be required to offset this dramatic change if it was desired to keep the distribution of tax burdens constant.

Table 7-3 shows how the ratio of taxes to income would change under ET reform. The first column shows the distribution of burdens under PIT – the system is progressive, except for a small element of regressivity at the top end. If we implement ET, levying a uniform upward shift in percentage marginal tax rates to keep revenue constant (column 2), this pattern is sharply changed. The system is only progressive over the eight bottom-income ranges – taxes rise from 12.0 to 17.5 per cent of income. For taxpayers with income over about $12,000 the system would be regressive, with the average tax rate taking a sharp dive to 6.7 per cent for the top-income group. Matters are improved a little if, instead of making up lost revenue by a uniform upward shift in marginal tax rates, revenue is maintained by grossing up all burdens by the same multiple. This alternative (shown in the third column of Table 7-3) improves progressivity for all but the top-income range, where the average tax rate drops to 5.8 per cent.

The change in tax rates, brackets, and exemptions required to offset the very large change in the relative tax base for top- and bottom-income groups in moving from the assessed income base to an ideal ET base, on the evidence of Table 7-2, appears politically feasible. On a tax-inclusive basis the average tax rate in the top-income group, for example, would have to rise from 17 to 26 per cent to keep its tax burden constant.[4] While this would require a significant revision of the tax schedule, it does

Table 7-2

Income and Consumption of Canadian Households, by Income Class, 1972

	Proportion of households	Assessed income[1] (1)	"True" income[2] (2)	Consumer expenditure[3] (3)	Noncapital income[4] (4)	(2)/(1)	(3)/(1)	(4)/(1)
	(Per cent)			(Dollars)				
Income class:								
Less than $3,546	16.6	4,305	4,496	5,201	3,920	1.044	1.208	0.911
$3,546 – $4,727	7.1	6,659	6,935	6,922	5,739	1.041	1.039	0.862
$4,728 – $5,909	6.9	7,579	7,893	7,721	6,722	1.041	1.019	0.887
$5,910 – $7,091	8.0	8,756	9,135	8,358	8,102	1.043	0.955	0.925
$7,092 – $8,273	8.9	10,457	10,936	9,833	9,476	1.046	0.940	0.906
$8,274 – $9,455	8.6	11,629	12,251	10,228	10,889	1.053	0.880	0.936
$9,456 – $10,637	8.5	12,876	13,612	11,103	12,149	1.057	0.862	0.944
$10,638 – $11,819	7.3	14,373	15,209	11,673	13,638	1.058	0.812	0.949
$11,820 – $13,001	5.6	16,375	17,420	12,989	14,764	1.064	0.793	0.902
$13,002 – $14,183	4.6	18,266	19,361	14,663	16,568	1.060	0.803	0.907
$14,184 – $17,729	9.3	20,706	22,133	14,787	18,908	1.069	0.714	0.913
$17,730 and over	8.6	39,136	44,511	21,205	28,209	1.137	0.542	0.721

1 Estimated income assessed for income tax.
2 Full labour, capital, and transfer payment income. (Capital income includes imputed rent and retained and sheltered earnings.)
3 Disposable income minus saving.
4 "True" income minus capital income.
SOURCE St-Hilaire and Whalley (1983), Tables 9 and 10.

not appear to be beyond the range of what is politically feasible.

In the case of a switch to an annual "wage" tax (actually levied on all economic income other than capital income), the change in tax rates, brackets, and exemptions required to keep average tax burdens by income group constant would be smaller than under ET reform, according to Table 7-2. In fact, from the second to the eighth income group (55 per cent of households), noncapital income actually rises as a fraction of assessed income, implying that tax rates, etc., might have to be altered to prevent an *increase* in progressivity over much of the income range. While noncapital income falls in relation to assessed income over the top 28 per cent of the households, dropping to 72 per cent for the top group, the fall does not proceed anywhere near as far as in the case of consumption expenditure. Whereas with ET the tax base of the top group relative to the bottom group would more than halve, under WT it would only drop by 21 per cent.

This is demonstrated by the illustrative calculations reported in Table 7-3. Under a wage tax, assessed capital income is no longer taxed. To preserve equal yield the aggregate tax saving is reallocated according to labour income in the first case and according to newly calculated tax payments in the second. There is an increase in progressivity relative to the PIT in both cases throughout the income range, except for the top-income group. As in the ET calculations, the tax burden for the top group falls, but in the WT case the drop is only from 16.5 to 11.9 per cent, rather than 6 to 7 per cent, as under ET.

The required changes in rates and brackets would also be much less dramatic under UIT than under ET reform. As Table 7-2 shows, true economic income – which includes, for example, imputed rent on owner-occupied housing, retained corporate earnings, and amounts accruing in pension plans – exceeds assessed income by a percentage that increases very gradually with income until we get to the top-income group. And even in the top group, true income only exceeds assessed income by about 14 per cent.

The relationship between estimated true income and assessed income shown in Table 7-2 implies that, as of 1972, appropriate base broadening would make possible a small decrease in marginal tax rates on upper-income groups, but hardly the decrease produced by a "flat tax." This is interesting because the flat tax has attracted considerable attention, and it has been claimed that base broadening would make possible a system with a uniform marginal tax rate (applying above some basic personal exemption) that would not greatly redistribute tax burdens between the income classes.

Table 7-3

Annual Incidence of Alternative Personal Taxes (as a Percentage of True Economic Income), Canada, 1972

	Current PIT	Expenditure tax		Wage tax	
		Case 1[1]	Case 2[2]	Case 1[3]	Case 2[2]
			(Per cent)		
Income class:					
Less than $3,546	1.6	12.0	8.1	1.0	0.6
$3,546 – $4,727	4.5	11.0	8.0	3.8	2.6
$4,728 – $5,909	7.0	13.5	11.8	7.5	6.6
$5,910 – $7,091	9.5	14.7	14.0	11.5	10.8
$7,092 – $8,273	10.8	15.9	15.7	12.4	11.8
$8,274 – $9,455	12.3	16.1	16.5	14.8	14.6
$9,456 – $10,637	13.5	17.1	18.0	16.2	16.3
$10,638 – $11,819	14.7	17.5	19.0	17.6	18.0
$11,820 – $13,001	15.2	16.9	18.3	16.5	16.9
$13,002 – $14,183	14.9	16.9	18.1	16.4	16.6
$14,184 – $17,729	16.9	16.6	18.5	18.6	19.4
$17,730 and over	16.5	6.7	5.8	11.9	11.9

[1] In case 1, the tax saving from a switch to an expenditure tax from the current PIT is reallocated according to consumption expenditure to maintain the tax yield.

[2] In case 2, the tax saving from a switch to an expenditure tax or a wage tax from the current PIT is reallocated in proportion to tax payments following reform to maintain the tax yield.

[3] In case 1, the tax saving from a switch to a wage tax from current PIT is reallocated according to labour income to maintain the tax yield.

SOURCE Based on St-Hilaire and Whalley (1983).

Smith (1984) shows that, for the 1980 tax year in Canada, if the income tax base had been broadened as he prescribes, a zero rate bracket of $4,500 and a single marginal tax rate of 20 per cent would have reproduced very closely the distribution of tax burdens across the income classes actually observed.[5] But this result is only obtained under a questionable form of base broadening.

We are accustomed to labeling all exemptions, deductions, and exclusions as "tax expenditures." It is widely supposed that in a move to a true income base all these tax expenditures (aside from basic personal exemptions) would be removed. However, this procedure would include abolishing the interest and dividend deduction, the dividend tax credit, the one-half taxation of realized capital gains (above the $500,000 lifetime exemption), and education, tuition fee, and employment expense deductions, all of which may help the tax base approximate true economic income. It could be argued that the preferences for investment income are necessary to avoid taxation of purely inflationary gains and to achieve a measure of integration with the corporate income tax, while education, tuition fee, and employment expense deductions allow workers to write off legitimate expenses of earning income.

We have already seen in Table 7-2 an indication that appropriate base broadening would only moderately increase the assessed income of top-income groups, on average, at least for 1972. To get a further indication of the likely impact, we can refer to data provided by the Department of Finance (1981) and issued with the November 1981 budget. From that document it is possible to calculate that tax expenditures for taxpayers with total income over $50,000 averaged 18.4 per cent of income. Of that 18.4 per cent, 10.7 per cent was made up either by one-half exclusion of capital gains or the interest, dividend, and capital gain deduction. Thus much of the increase in the taxable income of upper-income groups obtained in a study like that of Smith (1984) comes from the inclusion of questionable items in income.[6]

The conclusion on base broadening appears to be that if carried out correctly it would likely not increase greatly the average taxable incomes of the upper- relative to middle-income groups (although both would likely experience a rise relative to bottom groups). Hence a flat tax scheme would almost inevitably shift some of the tax burden currently resting on higher-income groups to middle-income groups.[7] For this reason it appears that proposals for moving the tax base closer to true economic income cannot realistically be coupled with a call for a flat tax.

The discussion to this point has only concerned changes in the *average* tax burden for taxpayers in particular income classes. While it is true that by adjustment of rates and brackets the current distribution of average burdens across these classes could be reproduced under either UIT, ET, or WT, the distribution of burdens among *individual* taxpayers would inevitably change. For example, under each tax reform considered the sheltering of capital income from particular sources (MURBs, oil and gas drilling funds, Canadian films, etc.) would cease. Those with investments in heavily sheltered form, or benefiting from special tax deductions, would experience an increase in tax under UIT[8] and also under ET if everyone consumed the same proportion of income. Of course, people consume widely varying fractions of income so that ET would additionally redistribute burdens by reducing tax paid by high savers and increasing it for low savers.

The reshuffling of tax burdens under alternative tax reforms when average burdens by income class are held constant is a reflection of the improvement in *horizontal equity* claimed for these reforms by their proponents. However, the windfall gains and losses generated by the capitalization of altered tax status of assets are widely regarded as inequitable, irrespective of the tax change that produces them.

An important qualification to this discussion of impact effects on annual income distribution is that it may give a poor idea for anything longer than the very short run. A substantial increase in saving, perhaps particularly marked at the top end of the income distribution, and changes in labour force participation (especially of women but also for young and old male workers) would probably be immediately touched off by a switch to WT or ET. Keeping the current degree of progressivity across income groups could prove more difficult in the face of these developments.

Impact Incidence – Lifetime Income Distribution

Just as it is possible to examine tax reform impacts on the annual distribution of income on the assumption of zero behavioural response, the effect on the lifetime distribution can be studied assuming current patterns of labour supply, saving, etc., remain unchanged over the lifetime. The analysis has some important special characteristics, however. For example, any discussion of the lifetime distribution of income can only focus on a single age cohort. The distribution for each cohort alive at the time of tax reform is affected differently. In this section, we will therefore look at the impact on lifetime income distribution for cohorts whose adult economic life takes place entirely under the reformed tax system. In the next section, effects on cohorts alive at the time of reform are discussed.

A further important feature of the analysis here is that it applies best to the introduction of *lifetime* wage or consumption taxes. Although an attempt is made to predict the lifetime impact of progressive annual UIT, the data presented here allow only a rough assessment, since they concern only lifetime magnitudes. It should also be borne in mind that the wage and consumption tax incidence comparisons between this and the previous section contrast the results of *lifetime* taxes with *annual* taxes. With progressivity, annual and lifetime wage or consumption taxes necessarily have differing incidence (even if incidence is assessed in both cases in a lifetime framework).

While changes in rates and brackets in principle make possible any desired distribution of tax burdens across annual income groups, in practice the required changes may not be made. In UIT reform a government might not reduce marginal rates at the top end sufficiently to offset base broadening, while in WT or CT reform there could be strong opposition to the increase in marginal rates required in the top brackets. An important consequence is that significant changes in progressivity in terms of annual income distribution could be experienced under any of these tax reforms. These effects are in each case likely to appear much smaller when viewed from a lifetime point of view. This generally makes the reform proposals look considerably more attractive.[9]

The data presented in Table 7-4 make the point concisely. These are taken from Davies, St-Hilaire, and Whalley (1984) who develop a microsimulation model of lifetime distribution and tax burdens. They show the estimated sources and uses of lifetime income for a steady-state society assumed to permanently embody the characteristics of Canada in 1970. In comparing these lifetime data with the annual data in Table 7-2 one finds that switching tax bases makes much less difference in a lifetime perspective than it would from an annual point of view.[10]

Table 7-4 can be used, first, to try to predict the impact on progressivity of the UIT and WT reforms. In both cases the difference from the annual picture depends on the contrast between annual and lifetime data in the relative importance of capital income across the income ranges. In the UIT case, base broadening probably consists mostly of including capital income more fully in assessed income. In the WT case, tax reform is a matter of *eliminating* all capital income from tax.

In the annual data capital income rises from 13 per cent of total income to 37 per cent from the bottom- to the

Table 7-4

Composition and Uses of Lifetime Income

	Share of total *L*	Composition of *L*			Uses of *L*			
		E/L	*G/L*	*I/L*	*C/L*	*B/L*	*T/L*	*M/L*
	(Per cent)							
Decile:								
1	4.2	81.2	15.3	3.5	86.7	4.4	8.9	9.4
2	6.2	86.8	10.4	2.8	82.3	5.2	12.5	12.2
3	7.3	89.2	7.9	2.8	81.5	4.7	13.8	10.9
4	8.3	91.2	6.6	2.2	80.4	5.0	14.6	12.8
5	9.1	90.3	6.2	3.5	79.4	5.2	15.4	12.4
6	9.7	92.7	4.5	2.8	77.9	6.0	16.1	14.1
7	10.7	91.6	4.7	3.7	78.4	5.1	16.5	14.0
8	12.0	92.5	3.3	4.3	76.7	6.1	17.1	17.5
9	14.0	91.3	3.0	5.7	76.2	5.6	18.2	14.2
10	18.4	88.3	2.3	9.4	71.7	8.6	19.7	21.8
All	100.0	90.1	5.2	4.7	77.7	6.0	16.4	15.1

NOTE L = lifetime resources, E = earnings, G = transfers, I = inheritances, C = consumption, B = bequest, T = direct taxes on L, and M = investment income. These are all present discounted values. Gini coefficient of $L = 0.218$.

SOURCE Davies, St-Hilaire, and Whalley (1984), Table 1, p. 640.

top-income groups. In the lifetime data, it rises from 9 per cent for the bottom decile to 22 per cent for the top.[11] Thus whether one taxes more or less of capital income does not affect progressivity quite as much from a lifetime point of view as from an annual perspective. Increased tax on capital income hurts the top lifetime deciles about twice as much as the bottom, whereas in annual data the differential impact is about 3 to 1.

There are at least two reasons why the relative importance of capital income does not vary so widely across lifetime deciles as across annual deciles. The first is simply a measurement phenomenon, while the second has to do with systematic age-related patterns.

The fact that capital income varies less in importance from bottom to top in lifetime data is partly just a necessary statistical consequence of its exclusion from "lifetime income." Including capital income in "income," as in the annual case, raises those with especially large capital income into the higher deciles and *must* therefore increase the variation in the relative importance of capital income in going from bottom to top.

Systematic age-related patterns of saving also have something to do with the contrasts between annual and lifetime data in the importance of capital income across income groups. Over the working lifetime both earnings and income tend to rise in real terms. For life-cycle savers it will also typically be the case that wealth and capital income rise in relation to earnings with age. The age groups in the range 45-64, relatively prosperous due to their position at the top of the age/income hump, therefore help to boost the importance of capital income for the top groups in annual income data. In the lifetime data, on the other hand, such effects are completely removed since we cumulate income over all ages.

Table 7-4 shows that assessing the impact on progressivity in a lifetime context would make more difference in the case of CT. Whereas consumption falls from 116 per cent of income for the bottom-income group to 48 per cent for the top-income group in the annual data, it only declines from 87 per cent of lifetime income to 72 per cent from the bottom to top lifetime deciles. Even from the lifetime point of view some reduction in progressivity might be feared under CT reform. However, if we believe that the lifetime viewpoint is more appropriate, it is a much less serious matter than suggested by the annual data.

The explanation of the contrast between the high variation of the consumption to income ratio in annual data and the low variation in lifetime data likely lies partly in patterns of saving out of transitory income and partly in systematic age-related factors similar to those considered above in the case of capital income.

If households save as predicted by life-cycle or permanent income theories, they have a low propensity to consume transitory income. This helps to explain why in annual data the top-income groups have such a low average propensity to consume – they are disproportionately peopled by those with large positive transitory income – and the low-income groups have such a high propensity – they are running down their wealth in anticipation that things will "pick up" in the future. Over the lifetime as a whole the only reason for variation in the fraction of income that is consumed is that higher-income groups make larger bequests as a fraction of their lifetime incomes. (In addition to Table 7-4, see Menchik and David, 1982.) While the evidence is that top lifetime deciles do have a higher propensity to bequeath, it is not sufficiently higher than among lower groups to make the lifetime consumption to income ratio fall with income anywhere near as fast as in annual data.

Turning to age-related factors, an effect similar to that found with respect to the importance of capital income at different income levels is at work. The middle-age group – say those aged 45-64 – has both high income and a high propensity to save, tending to force down the consumption to income ratio in the higher range of the annual income distribution. Again, this influence is completely removed in the lifetime framework.

Table 7-5 reports some rough and ready lifetime incidence calculations under alternative tax bases. Under the wage tax, the estimated portion of PIT paid on investment income is reallocated alternatively in proportion to lifetime earnings and in proportion to newly calculated tax payments in the second case. The results suggest that progressivity would not be much affected by a move to a wage tax base in the lifetime context. This conclusion even applies to the top-income decile, which compared with the top annual income range experiences a relatively small decrease in tax rate. This small impact is explained by two factors: 1) the much flatter distributions of lifetime labour and capital income, and 2) only an estimated 15 per cent of broadly defined lifetime investment income is actually taxable.

For the consumption tax case we attempt to show the results of adopting the CT option in the form where bequests are not taxed. The net lifetime tax saving is calculated by applying an average marginal tax rate to the value of bequests *minus* initial inheritances. To preserve equal yield the tax saving is reallocated in proportion to lifetime consumption in the first case and in proportion to newly calculated tax payments in the second case. From Table 7-5 it can be seen that the tax rates are not dramatically affected by a switch to a consumption tax. In fact, in case 2, aside from the bottom decile, there is a small but distinct *increase* in progressivity on CT reform.

Finally, note that the illustrative calculations of Table 7-5 concern only special versions of WT and CT reforms. The WT reform omits inheritances, while the CT reform

Table 7-5

Lifetime Incidence of Alternative Personal Taxes (as a Percentage of Lifetime Income), Canada, 1970

	Current PIT	Consumption tax		Wage tax	
		Case 1[1]	Case 2[2]	Case 1[3]	Case 2[2]
			(Per cent)		
Decile:					
1	7.3	8.2	7.4	8.0	7.5
2	11.3	11.1	10.6	11.7	11.4
3	12.5	12.5	12.2	13.0	12.8
4	13.5	13.0	12.7	13.8	13.7
5	14.5	14.2	14.1	14.7	14.6
6	15.1	14.4	14.3	15.5	15.4
7	15.7	15.8	15.8	15.9	15.9
8	16.7	16.7	16.8	16.6	16.6
9	17.7	18.3	18.5	17.7	17.9
10	20.5	20.5	21.0	19.5	19.8
All	15.8	15.8	15.8	15.8	15.8

[1] In case 1, the tax saving from a switch to a consumption tax from the current PIT is reallocated according to consumption to maintain the tax yield.

[2] In case 2, the tax saving from a switch to a consumption tax or a wage tax from the current PIT is reallocated in proportion to tax payments following reform to maintain the tax yield.

[3] In case 1, the tax saving from a switch to a wage tax from current PIT is reallocated according to labour income to maintain the tax yield.

SOURCE Davies, St-Hilaire, and Whalley (1984), Table 2, p. 641.

considered neglects bequests. From Table 7-4 it is clear that including inheritances under WT, or bequests under CT, would increase progressivity. (In fact, since lifetime income equals lifetime consumption plus bequests the same tax base would be reached in the two cases.) From Table 7-5, which shows little change in progressivity as a result of the WT and CT reforms considered, it is evident that moving to the comprehensive lifetime income base would likely increase progressivity somewhat.

Horizontal vs. Vertical Equity

This section has indicated that it may be preferable to assess progressivity in terms of the variation across lifetime income groups in the proportion of lifetime income which is paid in tax. This provides some reassurance that WT and CT do not necessarily reduce progressivity. However, we can go a step further and note the consequences for horizontal equity of viewing lifetime rather than annual magnitudes as the ideal tax bases.

If one views lifetime consumption or income as the ideal tax base, then even if progressivity declines a little under WT or CT, reform might be seen as improving equity. This is because equity has a horizontal as well as a vertical aspect. In a move to taxation on a noncapital income base (WT) one may regret that the relative tax burden on top-income groups will decline somewhat. However, there may be a more important sense of relief that at least high savers are not being penalized relative to those with equal opportunities, but who save and accumulate less and, therefore, have lower capital income.

Any given individual will have his/her own idea of the ideal tax base, even if it is a lifetime base. If one regards lifetime income as the correct base, a system that taxes wages and transfer payments but omits inheritances will not be very highly regarded. There may be a considerable difference on the equity front between a wage tax reform that taxes all of lifetime income, and one that allows gifts and inheritances to go tax-free.

Turning to the consumption tax, CT reform may not represent an unambiguous improvement in equity terms even if it is agreed that equity should be assessed on a lifetime basis. If lifetime income is considered the ideal tax base, it may be viewed as very serious if bequests are allowed to go tax-free.

There is one scenario in which a pure consumption tax would be viewed as providing the greatest horizontal equity. This is where one views the present value of the consumption not only of the current generation but of all generations (including heirs) as the appropriate object of taxation. Then amounts bequeathed are not viewed as escaping tax – they give rise to additional tax liability when consumed by heirs.

In conclusion, looking at impact incidence from a lifetime rather than an annual point of view makes the changes in progressivity induced by UIT, WT, and CT reforms look considerably less serious than would appear to be the case on the basis of annual income data.

Distributional Effects during Transition

All stylized tax reforms considered in this chapter would have major redistributive effects during the transition from the initial steady state to the tax-reform steady state. These effects include redistribution between age cohorts and between investors in different types of assets. The latter effects arise because of 1) the introduction of uniformity in the treatment of capital income across industries and sectors, and 2) differential valuation effects caused by changes in the after-tax rate of interest.

Redistribution between Age Cohorts

Intercohort redistributive effects during transition have already been discussed in some detail in Chapter 4, where we reviewed, for example, the AKS simulation model. We found that in moving to an ET all cohorts aged greater than 38 at the time of the policy change would be losers, and all those younger than 38 gainers, since older groups have a larger share of consumption expenditure than they do of income as measured for tax.[12] AKS also found that in a move to WT those aged over 38 at the time of the policy change would benefit, and younger groups would lose, since older groups have a smaller share of aggregate earnings than they do of income.

As discussed in Chapter 4, the AKS-type of analysis of transition is not a good guide to the likely intergenerational redistributive effects of the Blueprints-style consumption tax. This is because the AKS experiment makes all assets held at the time of tax reform retroactively registered without providing any refund for the tax deductions that were not in fact given in the past when "deposits" were made. Of course, this kind of reform has a very serious impact on those with high wealth – in a life-cycle context those nearing retirement or early retirees. Our version of the Blueprints reform, however, would respect the current division of assets between registered and nonregistered status. (Contribution limits to registered saving plans would be greatly increased, of course.) Thus the confiscatory effects of the AKS-style ET reform on the old would not be felt, although it is likely that the old would experience an increase in tax burdens due to relatively greater shrinkage in the tax base for younger people.

The intercohort effects of UIT are also of interest. The move from currently assessed income to true economic income as the tax base would largely consist of including capital income more fully. Thus, for example, capital gains would be taxed fully on a real accrual basis; and imputed rent on owner-occupied housing would be taxable. Such tax changes would increase the tax burden for the elderly, holding the tax schedule constant. However, RRSPs and RPPs would also be abolished, so that the old would gain by escaping tax liability on their full withdrawals from these registered plans. Since tax rates would also generally decline, due to the overall expansion of the tax base, the net effect would likely be a shift in tax burdens from the elderly towards younger groups.

Capital Gains and Losses

Windfall gains and losses to different classes of investors may occur under any of the three proposed tax reforms for two reasons. First, gains and losses may occur due to capitalization of the changes in future tax liability caused by the move to uniform treatment of capital income. Second, the value of different assets will not be affected uniformly by any change in the after-tax rate of interest that may be generated. The first effect may be isolated by considering assets that provide constant expected streams of income into the indefinite future ("consols"). The discounting effect of a change in the after-tax interest rate is uniform for such assets. Differential discounting effects can be introduced into the discussion subsequently.

Consols

Very long-term bonds or blue-chip stocks are assets which for present purposes approximate consols. Real estate (including owner-occupied housing) also might be roughly viewed as coming into this category. Holding the gross rate of interest constant (reasonable for Canada, essentially a taker of world interest rates), and assuming that tax rates on interest income would not change for any investor under the UIT reform, capital gains would be experienced under either UIT or CT reform by all those holding "consols" on which the total tax wedge (i.e., CIT plus PIT) exceeds the tax rate on interest. Capital losses would occur where the total wedge was lower than that on interest.[13]

There are important qualifications to this analysis. For example, it makes a difference whether the tax reform abolishes CIT or merely integrates it with PIT, due to the openness of the Canadian economy. If CIT is completely abolished, investment in Canada becomes more attractive for foreigners, and we will move to a new equilibrium where the *gross* returns in Canadian business are lower than formerly. The expectation of this effect will tend to erode capital gains. This mechanism is not at work when the current CIT is retained and CIT and PIT are integrated. In that case the relation between gross and net-of-tax profitability of investment in Canada is not disturbed for foreigners.

What would capital gains and losses look like for the types of assets identified above as approximating consols? Currently housing is tax-free under PIT, interest is fully taxed, and corporate-source income also bears significant tax. Thus, according to the above argument, due to the uniformity in tax treatment of capital income introduced under either UIT or CT, under both tax reforms capital gains would be experienced on equity and bonds relative to housing. The distributional implications are likely disequalizing.

Differential Discounting Effects

For assets with an expected variable stream of returns, or with short lives, the above analysis is inappropriate. These assets are badly approximated by consols. To take an example, under CT the value of a consol previously taxed at the same rate as interest does not change. However, an investment previously taxed in common with interest at a rate of, say, 50 per cent, and yielding its returns over only five years, will *increase* considerably in value when all capital income taxes are removed.[14]

In general, the heavier discounting produced by an increase in the after-tax interest rate under CT will increase the relative value of assets whose returns occur on average earlier. (This is illustrated by the example of the previous paragraph.) The likely distributional effects of the differential discounting effect can therefore be assessed by considering the return profiles of different types of assets.

In the case of human capital the percentage decline in value at the time of tax reform could be greater for younger workers than older workers. It would also likely be higher for workers expecting a more rapid increase of earnings in the future. Young, highly educated workers are on the steepest age/earnings trajectories and will tend to lose out relative to less highly educated workers in the same age range. Thus there may be both inter- and intracohort redistributive effects from differential discounting impacts on human capital. While the intracohort effect is equalizing, the decline in the human capital of the young relative to the old may be considered a problem.

With respect to physical assets, it appears that the differential discounting effect might be equalizing, although this is somewhat speculative. Lower-income groups have both higher proportions of debt and fixed-value assets (cash, savings accounts, etc.) than higher-income groups. They therefore stand to see a *relative* increase in the value of their portfolios.[15]

Finally, one might ask whether human capital will decline in value relative to physical capital as a result of the differential discounting effect. This depends to an extent on whether earnings are to be received, on average, further in the future than the return to physical capital. In other words, on average, is human capital longer-lived than physical capital? The answer to this question is not clear. What may be more important, however, is that in moving to CT the stream of returns to human capital will not be taxed at a lower rate. (If anything, the opposite will occur.) For most forms of physical capital (with conspicuous exceptions – e.g., housing), in contrast, the net stream of returns will increase. Thus it appears likely that human capital will decline in value relative to physical capital for the representative investor. This would likely be disequalizing.

Distributional Effects in the Steady State

If closed-economy neoclassical growth models were to be believed, the tax reform proposals considered here would have radically different effects on income distribution in the steady state. UIT reform would depress saving and the capital/labour ratio, leading to an increase in the gross rate of return to capital and a decline in real wages. CT reform would do the opposite. Real wage increases would likely equalize the distribution of income, so that UIT could be attacked, and CT defended, in the closed-economy context on the grounds of long-run distributional effects.[16] In addition, the possible gain under UIT reform in terms of horizontal and vertical equity would be qualified by the large welfare losses imposed on future generations, which might be seen as reducing intergenerational equity.

While the above analysis might be useful, for example, for the United States, which could conceivably be approximated as a closed economy, it is not relevant for Canada. Given that foreigners are the marginal investors in Canada, effective reduction in taxes imposed on the Canadian-source income of foreign investors will lead to an increase in the capital/labour ratio in Canada and an improvement in real wages with a probable equalizing effect on income distribution. However, this is a benefit that could in principle be secured under either UIT or CT reform.[17] It is purely connected to the incentive to *invest* and is independent of the effect of changes in the intertemporal distortion on domestic saving. With full international capital mobility, increased saving in Canada need not stimulate increased investment.[18]

While the possibility of an increase in the capital/labour ratio and real wages for Canada is in principle independent of which broad tax reform option is chosen, there are other steady-state distributional effects that do depend on whether UIT or CT reform is undertaken. UIT reform will, on the one hand, maintain the tax bite on interest, while CT reform will make the after-tax interest rate correspond to the before-tax rate. With gross interest rates given by world capital markets, those with higher saving propensities will, therefore, clearly be better off under CT reform. To the extent that the better-endowed have lower rates of time preference, this confers a special benefit on them, which is disequalizing.

Another consequence of changes in the after-tax rate of interest may be some impact on the relative value of human capital and inherited wealth. As mentioned in the previous section, an increase in the discount rate will reduce the relative human capital endowment of those who would receive earnings, on average, later over the lifetime. Thus the more highly educated would lose relative to others.[19] (The more highly educated not only begin to work later but are observed to have steeper age/earnings profiles.) This is likely an equalizing tendency.

In the steady state the value of physical capital will be determined by its production cost. The capital gains and losses of the transition period, which allowed a divergence of capital values from replacement cost, will have been entirely ironed out. Thus it is not very interesting to ask, in the steady state, whether the value of human capital will rise or fall relative to that of physical capital. It may be interesting to ask, however, whether the value of human capital rises or falls relative to that of inherited wealth.

The steady-state relationship between human capital and inherited wealth depends on patterns of intergenerational saving. These are imperfectly understood. Although some insights are possible (see Chapter 8), a definitive discussion is not possible. Here we make a few simple points assuming mechanical patterns of human capital investment and bequest.

If education, labour supply, and real inherited wealth were exogenous and the same across alternative tax regimes, the question of the relative importance of human capital and inherited wealth would depend on the effect on these two flows of taxation and discounting. The earlier discussion on impact effects on the lifetime income distribution covered the first point. On the second, the question is whether in moving to CT the increase in discount rates would make inheritances look more or less sizable compared with human capital. The evidence seems to be that inheritances are, on average, received somewhat later in life than earnings. Thus their relative value would perhaps decline, on the assumption of exogenous before-tax flows, in the move to CT reform.

The conclusion is that in a small open economy like Canada's, the long-run steady-state distributional impacts of alternative major stylized tax reforms are unfortunately unclear. The rise in after-tax rates of interest under CT reform has some disequalizing tendency – a benefit is conferred on higher-income groups who like to save more – but, on the other hand, this increase also has equalizing effects – the relative value of the human capital of the more highly educated declines and, with earnings and inheritances exogenous, inherited wealth may bulk smaller as a fraction of lifetime income. With such competing effects it is clearly important to develop an explicit model in which distributional effects can be assessed.

Summary

We have seen in this chapter that the impact effect on the annual distribution of income of a move to an annual wage tax or expenditure tax would be quite regressive, while that of a move to a uniform income tax would be somewhat progressive. There are at least two reasons why this does not provide a damaging attack on any of the reform proposals. One is that the tax schedule can, in principle, be changed to offset the change in progressivity. The other is that the changes in progressivity are actually fairly small when the incidence impact is measured from the point of view of lifetime rather than annual data.

In moving beyond impact incidence we have seen that there are important transitional effects of the tax reform schemes, and that there may be significant distributional effects in the steady state. In a pure expenditure tax case, the transitional effects involve redistribution from the older cohorts at the time of the policy change towards the younger, while under pure wage tax or UIT reforms redistribution from the younger to the older cohorts occurs. We have argued, however, that the significance of these intergenerational redistributive effects has been at times greatly exaggerated. CT reform, in particular, would likely involve a mixture of expenditure and wage tax approaches (as under the Blueprints scheme). Thus even the likely *direction* of intergenerational redistribution under consumption tax reform is not obvious.

Another effect of either reform in transition would be capital gains and losses due to the removal of non-uniformity in capital income taxation. In the case of UIT reform, uniform treatment involves full taxation of all forms of capital income. This will tend to depress the value of physical capital relative to human capital (which will also benefit from a general rate reduction due to the larger tax base), which is equalizing. In the case of CT reform, uniform treatment of capital income means that none of it would be taxed. This would increase the value of physical capital relative to human capital, with the opposite effect. An important proviso is that capital gains and losses on physical capital will tend to be mitigated by international flows of capital.

Other interesting distributional effects in transition would occur under CT, where the after-tax rate of interest increases. Such an increase would raise the relative human capital of older compared with younger groups; reduce the human capital of the more highly educated relative to the less skilled, which is equalizing; and rearrange asset values depending on how long-lived different assets are.

Steady-state distributional effects also follow under CT assuming that after-tax discount rates increase. As in transition, the relative value of the human capital of the more highly educated is reduced, which is equalizing. However, those with higher saving propensities obviously benefit, which is disequalizing. Finally, the relative importance of inherited wealth as a fraction of lifetime income may decline since inheritances appear to be received on average later in the lifetime than earnings. This would be equalizing. Thus, as with transitional effects, it is not clear, *a priori*, whether the steady-state distributional effects of CT would be equalizing or disequalizing. Once again an explicit model is required to follow the relative strength of the competing effects to be investigated.

As if the above complexity were not bad enough, in thinking about the steady-state impacts of the alternative reforms we have seen that we must bear in mind the openness of the Canadian economy and the high degree of international capital mobility to which we are exposed. These considerations imply a separation of the determinants of saving and investment in Canada. As discussed in Chapter 5, as long as foreign investors are marginal, and changes in Canadian CIT affect the effective tax rate for foreign subsidiaries operating in Canada, then whatever reform is enacted in Canada, we can increase the long-run capital stock, and also likely the real wage (probably equalizing), by reducing CIT rates. (If there is nothing we can do to affect incentives for foreign investors, and they remain marginal, we are equally powerless to increase the capital stock under each of the alternative reforms.) In contrast, in the closed economy these favourable effects can only be achieved under consumption tax reform, since there is no separation in the tax effects on saving and investment.

Conclusion

This chapter has shown that simple notions about the distributional impacts of alternative tax reforms are dangerous. We have to take into account not only impact, but also transitional and steady-state effects. Also, rather than looking at changes in the distribution of annual income, we should probably be concerned with the distribution of lifetime income. Despite this complexity, there are two definite conclusions of the chapter. One is that the notion that consumption tax reform *must* reduce progressivity while a uniform income tax would do the opposite is probably false. These impacts are only assured if we look just at the distribution of annual income in the impact period and ignore possible changes in the tax schedule. The other major conclusion is that, in the long run, the openness of the Canadian economy means that the favourable effects on economic growth and income distribution of achieving a higher capital stock and real wage are, in principle, accessible under either CT or UIT reform. This is because neither approach is wedded to the taxation of capital income at the level of the firm *per se*. The stimulative effects of reducing or eliminating CIT are, in principle, available under either CT or UIT. However, in practice CIT forms an important part of the UIT strategy (see Chapter 3). Hence there is likely the prospect of greater prosperity for wage earners in the long run under CT than under UIT.

8 The Treatment of Bequests under Capital Income Tax Reform: Efficiency and Distributional Aspects

The purpose of this chapter is to consider the efficiency and distributional effects of the tax treatment of capital transfers under the consumption tax (CT) and uniform income tax (UIT) reform options. For the purposes of this discussion such transfers will be treated as if they were always intergenerational. Both gifts and bequests made will be referred to as "bequests," while gifts and bequests received will be termed "inheritances" or "inherited wealth."

The special problems in tax reform created by bequests arise principally from the evidently widespread feeling in our society that individuals, rather than dynasties, are the appropriate objects of taxation. Thus, for example, if the ideal tax base were considered to be the wealth of a dynasty, and proportional taxation was countenanced, dynastic wealth could be taxed very simply by levying a proportional consumption tax in each period. However, due to different rates of saving, this scheme would inevitably burden individuals with lower propensities to bequeath with higher taxes over their lifetimes. To some this may appear inequitable, despite the fact that the descendants of those who are particularly frugal in the current generation will pay higher taxes on their large inherited wealth when it is consumed in the future.

If the dynastic basis for computing resources and appropriate tax burdens is considered unacceptable, it may be desired to tax strictly according to the lifetime wealth of the current generation. In this case, under the CT approach bequests must be considered an item of consumption and must therefore be taxed. Under the Blueprints scheme, for example, this would mean that amounts in registered accounts on death would be taxed under PIT in the year of death, as outlined in Chapter 3.[1]

As soon as it is determined that bequests must be taxed under the consumption tax approach an anomalous situation develops. A large part of the attraction of the CT approach is supposed to be its neutrality with respect to intertemporal choice. However, if we think of the members of a dynasty as sharing an intertemporal utility function defined over the consumption of successive generations, a tax on bequests creates a distortion in intergenerational consumption allocation, which creates an excess burden as surely as taxation of capital income over the life of a taxpayer.

Of course, if generations are in fact not linked by feelings of altruism, that is, if bequests are typically a residual caused by uncertain lifetime and an imperfection of capital markets which prevents people from taking out life annuities on all their wealth, then taxing bequests will not cause a distortion. In the case where bequests are all "accidental," a tax on bequests might even be ideal – it would be lump sum and would be attractive on distributional grounds.

The desirability, or otherwise, of a tax on bequests is thus intimately connected with the determinants of bequest behaviour. These have been the subject of considerable recent research and empirical investigation, which are surveyed in this chapter. The importance of the whole issue is also clearly connected with the aggregate dimensions of bequests. If the annual flow of intergenerational transfers is small, whether or not we tax bequests is unlikely to be very important from either a distributional or efficiency point of view. Again there has been important recent research, which is also reviewed in this chapter.

This chapter is organized as follows. We start by examining the available evidence on the distribution and size of bequests. We set out alternative theoretical explanations for bequest behaviour and their implications for the distributional and efficiency effects of taxes. We then present an overview of partial equilibrium models which explain bequests as originating from feelings of altruism between generations. An examination of alternative partial equilibrium models of bequest, providing explanations in terms of uncertain lifetime and the desire to accumulate wealth for its own sake, and "strategic bequests" follows. We also survey some dynamic partial equilibrium modeling of the bequest process that has been undertaken recently. Finally, we look at recent general equilibrium modeling of tax reform options, which takes bequests into account in some fashion.

Distribution and Size of Bequests

Distribution

It is well known that the distribution of inherited wealth is highly positively skewed. This skewness is evident from casual observation. Most lower- and middle-income people have inherited very little, and the same goes for many higher-income persons, while the extremely large intergenerational flows among the "super-rich" are the object of considerable interest and comment. But it also shows up in the available estimates of the size distribution of inherited wealth, based on survey evidence and simulation.

Both the 1960 survey by Morgan et al. (1962) and the 1963 Federal Reserve Board Survey of Financial Characteristics of Consumers (SFCC) questioned representative samples of American families about gifts and inheritances that they had received. In both cases it was found that only about one-fifth of families reported having received an intergenerational transfer. Some idea of the probability of *ever* receiving a transfer (at least one worth remembering in an interview) is given by the proportion of those aged 65 and over who had received a gift or inheritance. This stood at about one-third in both surveys – impressive evidence of positive skewness (Barlow et al., 1966, p. 93). A later survey, which concentrated on the affluent, found that among those families with income over $10,000 in the United States in 1964, 47 per cent had received a gift or inheritance at some point. The fraction who reported a gift or inheritance increased with income, but the proportion of total assets that people attributed to gifts or inheritances was more or less flat with income[2] (Barlow et al., 1966, pp. 91-3).

An estimate of the size distribution of inherited wealth, together with distributions of lifetime earnings, net worth, and annual income, generated in the simulation model of Davies (1982*a*), is presented in Table 8-1.

Davies presented a microsimulation of saving and bequest for Canada in 1970 based on a bequest-augmented life-cycle model benchmarked to the estimated distribution of wealth in Canada in 1970. The simulation traces a single cohort through its life cycle. Inheritance must be specified from a source outside the model, but the behavioural parameters are set so that the bequests generated are of the right size for steady-state growth to continue.

Initial inheritances in Davies are generated as follows. The 1970 distribution of wealth was assumed to represent a steady-state situation. A simulation of mortality among the *parents* of the cohort studied in the main simulation was then conducted. This took account of gifts *inter vivos*, funeral, administrative, and death tax leakages, and the splitting of estates between spouses and children. The result was a set of inheritances that would average

Table 8-1

Distributions of Selected Economic Characteristics, Family Units, Canada, 1970

	Inheritances[1]	Life earnings[1]	Net worth[2]	Annual income[2]
		(Percentage shares)		
Family units:				
Top 1 per cent	24.6	4.8	19.6	n/a
Top 5 per cent	46.3	14.6	43.4	n/a
Top 10 per cent	60.0	24.0	58.0	26.9
Top quintile	74.1	39.3	74.0	43.2
Second quintile	15.8	23.9	17.8	24.8
Third quintile	7.8	18.2	8.0	17.7
Fourth quintile	2.3	13.0	1.7	10.6
Fifth quintile	0.0	5.6	–1.5	3.7
Coefficient of variation	3.400	0.687	2.519	0.950
Gini coefficient	0.727	0.338	0.746	0.400
		(Dollars)		
Mean	17,212	272,037	27,600	8,845
Median	6,571	248,765	11,000	7,838

1 Simulated.
2 Observed.
SOURCE Davies (1982*a*).

$17,212 in present value for the cohort aged 20 starting out in 1970. This figure represents only 6 per cent of total lifetime resources. However, the accumulated value of past inheritances received averages $14,528 across the population of families present in 1970 – 53 per cent of the estimated mean family wealth of $27,600.

The extreme skewness of the distribution of inherited wealth in Davies is the most striking feature of Table 8-1. The table indicates the high concentration in the distribution of net worth, which is well known: the share of the top 1 per cent of families in Canada in aggregate wealth in 1970 is estimated to be 20 per cent, and that of the top decile is 58 per cent. However, the distribution of inheritances is even more unequal: the share of the top 1 per cent is 25 per cent, and that of the top decile is 60 per cent.

Size of Bequests

Recently, considerable controversy has surrounded an attempt by Kotlikoff and Summers (1981) to estimate the split in existing nonhuman wealth between inherited and life-cycle wealth. The component of current wealth attributed to inheritance is the real value of all gifts and inheritances received accumulated to the present at an average (after-tax) real rate of return.[3] Life-cycle wealth, on the other hand, is the real value of earnings minus consumption ("saving out of earnings") accumulated to the present at the same interest rate.

Kotlikoff and Summers used two alternative methods in their attempt to split U.S. household wealth in 1974 between "transfer" and "life-cycle" wealth. First, they used aggregate earnings and consumption data, and age/sex relative earnings and consumption profiles from cross-section surveys, as inputs in calculating the life-cycle wealth of surviving members of cohorts present in 1974. Several alternative methods of estimating average rates of return were employed. (No account was taken of possible differences in rates of return across income groups.) The results indicated that out of a total of $3,884 billion in household wealth, only $733 billion could be accounted for as life-cycle wealth on the most liberal assumptions. Thus Kotlikoff and Summers concluded that just 19 per cent of household wealth is life-cycle wealth according to a cautious estimate.

The second method employed by Kotlikoff and Summers was to estimate the volume of transfer wealth on the basis of an extrapolation – taking into account growth rates, the age gap between generations, etc. – from the apparent flow of transfers in 1974. The main element in this procedure was to simulate bequests by applying mortality probabilities to the 1963 SFCC cross-section wealth distribution. This generated an annual flow of $26 billion, a bit more than one-third of what would be required ($70 billion) if 80 per cent of household wealth were transfer wealth, as suggested by the first method of estimation.[4] An additional $19 billion was found by including support by parents to college students ($10.3 billion), the formation of trusts ($6.2 billion), and life insurance death benefits ($2.5 billion). Although the total estimated flow of intergenerational transfers, at $45 billion, fell short of the $70 billion apparently required for consistency with the results of the first method of separating transfer and life-cycle wealth, Kotlikoff and Summers viewed the results of the second method as broadly confirming that the bulk of wealth is inherited.

What are we to make of Kotlikoff and Summers' conclusions? As pointed out by Modigliani (1984), for example, there are numerous difficulties with the calculations – many of them recognized by the authors. These include technical problems with both of the estimation methods. However, there is also a serious conceptual problem. Kotlikoff and Summers attribute the accumulating income on inherited wealth to the transfer wealth component. Since, if this income is saved, this is the result of an act of the current generation, it would seem more natural to attribute this source of saving to the life-cycle component. An indication of the possible result is given by the fact that in the Barlow et al. survey of affluent Americans, which asked respondents whether their own saving, appreciation of assets, or inheritance was mainly responsible for their current wealth, only about one-seventh of families, at all income levels, indicated that the bulk of assets were inherited (Barlow et al., 1966, p. 88).

Difficulties with respect to the direct calculation of life-cycle wealth include:

1) Quality of aggregate data: The key data are the age/sex profiles of earnings and consumption.[5] As is well known, aggregate earnings and consumption are measured with significant error. This is important here since a) the *levels* of the age/sex earnings and consumption profiles are set by reference to the aggregate data, and b) small percentage errors in earnings or consumption translate into large percentage errors in the residual saving.

2) Quality of age/sex profiles: Data on changes in the age/sex profiles of earnings and consumption over the period 1900-79 are meagre, to say the least. For earnings, separate profiles were estimated for every year from 1950 to 1974, but no data were available for the earlier period. The profiles for 1900-50 were, therefore, based on estimated 1955 profiles. For consumption the situation was worse: all the profiles came from data for a single year,

generated by the 1972-73 Consumer Expenditure Survey. Possible sensitivity to profile shapes was assessed by Kotlikoff and Summers and found to be significant.[6]

Difficulties in the calculation of transfer wealth are no less severe:

1) Bequest data: It is not clear whether the simulation of bequests via applying mortality rates to the 1963 SFCC took account of funeral, administrative, and death tax leakages. These are large in the aggregate. (If they averaged $3,000, for example, with about 1.5 million deaths in 1974, these costs would total $4.5 billion, 10 per cent of the flow of bequests estimated by Kotlikoff and Summers.

2) College support: It is unclear whether funds expended in support of college education should be included in transfer wealth. The funds are used to finance the formation of *human* capital. If we are to include intergenerational transfers in the form of human as well as material wealth, it could be asked why Kotlikoff and Summers do not add in, as well, all expenditures by parents in supporting dependent children, whether or not they are at college? Also, of course, the inherited wealth so computed should be compared with *total* wealth – that is, the sum of both human and nonhuman capital observed in 1974. Disallowing the college support component would reduce the estimate of transfer wealth by 22 per cent.

Kotlikoff and Summers do not provide the only evidence on the importance of inheritances. The simulation of Davies (1982*a*) discussed above, for example, provides further evidence, for Canada.

Davies' results are in broad agreement with those of Kotlikoff and Summers that transfer wealth makes up a large part of household nonhuman capital. As indicated above, although Davies finds that the present value of inheritances, on average, is just 6 per cent of lifetime resources, the accumulated value of inheritances received in the past, in a cross section, is 53 per cent of estimated family wealth. If the "interest" on inheritances received in the past is viewed as part of life-cycle saving, however, the value of inherited wealth is only 35 per cent of wealth.

There is also considerable literature that examines how the wealthy obtained their riches. This is relevant to the composition of total household wealth since a large fraction of assets are in fact owned by a relatively small group, who could be described as "wealthy."

The earliest reliable evidence on how people became rich was provided by Wedgwood (1929), who took a sample of decedents in the United Kingdom and then traced their fathers' wealth on death. Wedgwood found that about two-thirds of those dying wealthy had fathers who had also died with significant wealth – implying that much of the assets of top groups should be regarded as inherited.[7]

Wedgwood's study has been repeated using data from several different periods by Harbury (see, for example, Harbury and McMahon, 1973) who finds that the importance of inheritance is much the same in the postwar period in the United Kingdom as it was earlier according to Wedgwood. A study has also been performed for Connecticut, using data from the late 1930s and early 1940s, by Menchik (1976), with similar results.

Finally, journalistic investigations confirm the picture suggested by Wedgwood, Harbury, and Menchik. For example, the U.S. magazine, *Fortune*, has periodically compiled lists of the rich and the "super-rich" in the United States and has sought to determine their principal sources of wealth. As of 1968, about half of the "centimillionaires" in the United States owed the bulk of their wealth to inheritance, according to this source (Atkinson, 1975, p. 153).

A final caveat, which is stressed below, is that even if transfer wealth is quantitatively important, it is not clear that there is a strong bequest motive for saving. Davies (1981) investigated the extent to which a combination of uncertain lifetime, and a total failure of annuity markets, could explain the observed low dissaving of the elderly. The results indicated that, for a range of plausible parameter values, the pure life-cycle model under uncertain lifetime produces a much lower rate of dissaving among the elderly than is obtained under certainty. This implies that the elderly will hold considerable precautionary wealth, even at quite advanced ages. This wealth may be sufficiently large to produce sizable inheritances.

While uncertain lifetime could explain a significant flow of bequests without there being any bequest motive, it may be questioned whether it could account for *most* of the observed flow. According to Table 8-1, a quarter of all inheritances are received by just 1 per cent of families, while 60 per cent are received by the top decile. It is hard to believe that very much of the average of $423,415 received by the top percentile has been left to them because their parents, who were pure life-cycle savers, could not buy annuities. Some kind of bequest motive is likely important at the top end of the income distribution. Given that inheritances at the top end are such a large fraction of aggregate intergenerational transfers, this means that the bequest motive must also be reasonably important in explaining the overall flow of bequests.

Partial Equilibrium Models of Bequest under Altruism with Fixed Earnings

There is now a considerable theoretical literature that models bequests as resulting from parental feelings of altruism towards children, and does so in a partial equilibrium setting. A common model has emerged in the work of, for example, Ishikawa (1975), Becker (1974), Blinder (1976), Tomes (1981), and Menchik and David (1983). A version of this model with homothetic preferences is examined in this section.

In common with much of the literature cited above we consider a two-generation model in which parents seek to maximize:

$$U = U(C_1, C_2), \tag{8.1}$$

where C_1 and C_2 are the consumption of parent and child, respectively.[8] (We will maintain the fiction that each family has just one parent and one child. The extension to multiple children is straightforward but of lesser interest in the present context.) The utility function $U(C_1, C_2)$ is maximized (in the absence of government) subject to the constraint:

$$\begin{aligned} C_1 + \frac{C_2}{1+r} &= E_1 + I_1 + \frac{E_2}{1+r}, \\ &= R_1 + \frac{E_2}{1+r} = Z, \end{aligned} \tag{8.2}$$

where E_i and I_i represent the earnings and inheritances of generation i, $R_i = E_i + I_i$, and r is a constant rate of interest.

If we assume U is homothetic, the parent's problem has a simple solution. It is to allocate a particular fraction, θ, of dynastic wealth, Z, to one's own consumption and reserve the rest for C_2, according to:

$$\begin{aligned} C_1 &= \theta Z, \\ C_2 &= (1 - \theta)(1 + r)Z. \end{aligned} \tag{8.3}$$

This planning is illustrated in Figure 8-1. The diagram immediately makes clear the parallel to the consumption-planning problem of the two-period life-cycle saving model. There is an endowment point, A, determined by the income of parents, R_1, and child's earnings, E_2. As we have set out the problem, the parents can make C_1, C_2 deviate from R_1, E_2, by moving up or down a straight-line budget constraint passing through A, with slope $-(1 + r)$. Depending on the strength of intergenerational altruism, a point high or low on this budget constraint might be chosen. We have illustrated a case where parents place more or less equal weights on C_1 and C_2, so that desired C_1 and C_2 are not too dissimilar.[9] The size of bequest is given by the horizontal difference between R_1 and C_1. Accumulated into the future, this bequest provides the next generation with an inheritance, I_2, given by the vertical differences between R_2 and E_2.

Note that we have so far not ruled out the possibility of a desired negative bequest. A parent with little feeling of altruism towards his child might desire to *borrow* against the child's earnings capacity – that is, to locate on a portion of the budget constraint below A. Unless parent and child share the same intergenerational utility function, although such a point might be desired, it cannot actually be realized. While negative intergenerational transfers are certainly observed, they do not appear to approach positive bequests in quantitative importance and are not really consistent with the current analysis. (If children feel altruism towards their parents, why doesn't the parent's utility function include *his* parent's consumption, C_0?) Thus for the remainder of this section we will assume that when *desired* bequest is negative, *actual* bequest will be zero.

Letting $B_1 = R_1 - C_1$ be the bequest, from equation 8.3 we can derive the bequest function:

$$\begin{aligned} B_1 &= R_1 - \theta Z, \\ &= (1 - \theta)R_1 - \frac{\theta E_2}{(1 + r)};\ R_1 - \theta Z > 0, \\ &= 0;\ R_1 - \theta Z \leq 0, \end{aligned} \tag{8.4}$$

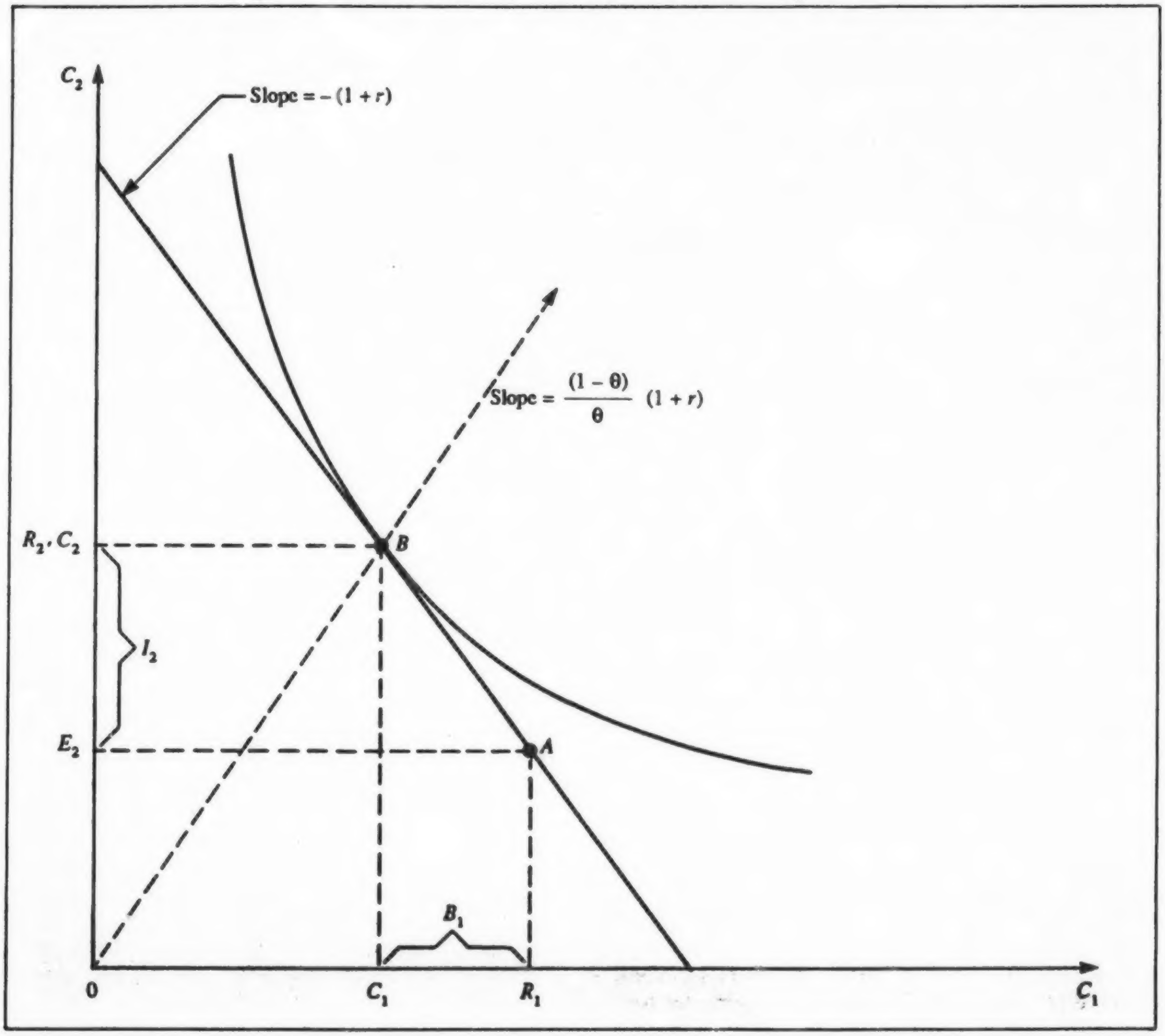
which is illustrated in Figure 8-2.

As shown in Figure 8-2, the bequest function has a constant slope, $(1 - \theta)$, in R_1, and emanates from a point on the horizontal axis given by the level of R_1 which produces $B_1 = 0 = [R_1 - \theta E_2/(1 - \theta)(1 + r)]$. A decrease in E_2 shifts the function upward, as illustrated by the two functions drawn in the diagram for a child's low earnings, E_2^L, and high earnings, E_2^H.

Figure 8-2 indicates that the marginal propensity to bequeath out of parent's income is predicted to be zero up to some critical level and then to take on a constant positive value. Also, by drawing a ray from the origin to successive points on the bequest function, we can see that

Figure 8-1

Determinants of Bequest under Altruism, with Fixed Human Capital



the average propensity to bequeath out of R_1 is increasing over the range of positive B_1. This in turn implies that the income elasticity of bequest should be decreasing over the range of positive B_1.[10]

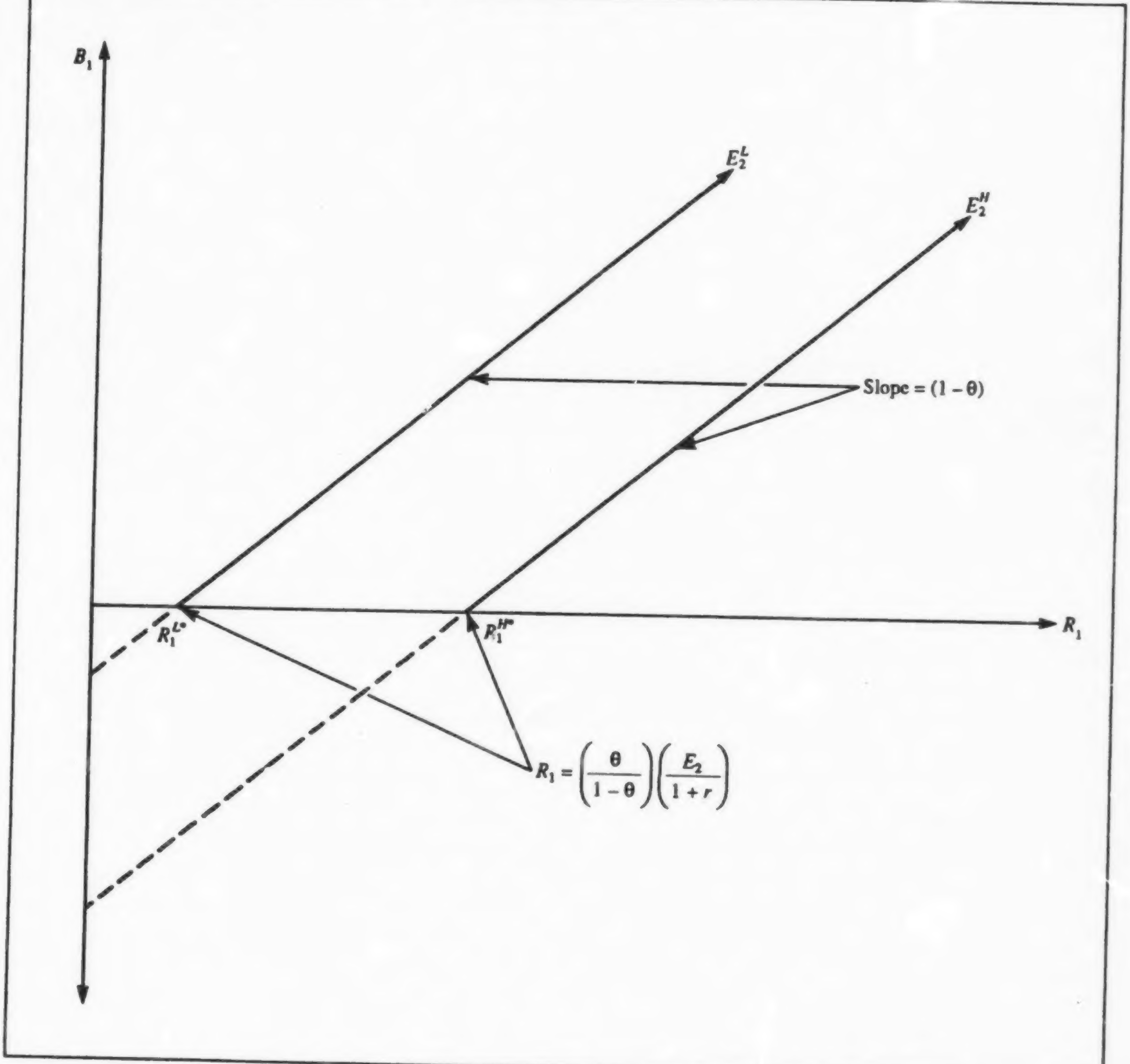
Whether these predictions square at all with the empirical evidence is obviously an important question. Before answering it, however, there are further insights that can be drawn out with the help of Figure 8-3.

Figure 8-3 shows two alternative situations that typify bequest determinants for low- and high-earning families. Endowment point A' shows the case of typical low-earning parents. Due to the well-known phenomenon of "regression to the mean" in earning capacity, children of low earners on average have higher relative earnings than their parents, explaining why A' has been drawn with $E_2 > R_1$. In contrast, high-earning parents typically have offspring whose relative earnings are lower. Thus point A has been drawn with $E_2 < R_1$.

Imposing a single set of indifference curves in Figure 8-3, we obtain a corner solution for the low-earning

Figure 8-2

Bequest Functions, with Fixed Human Capital

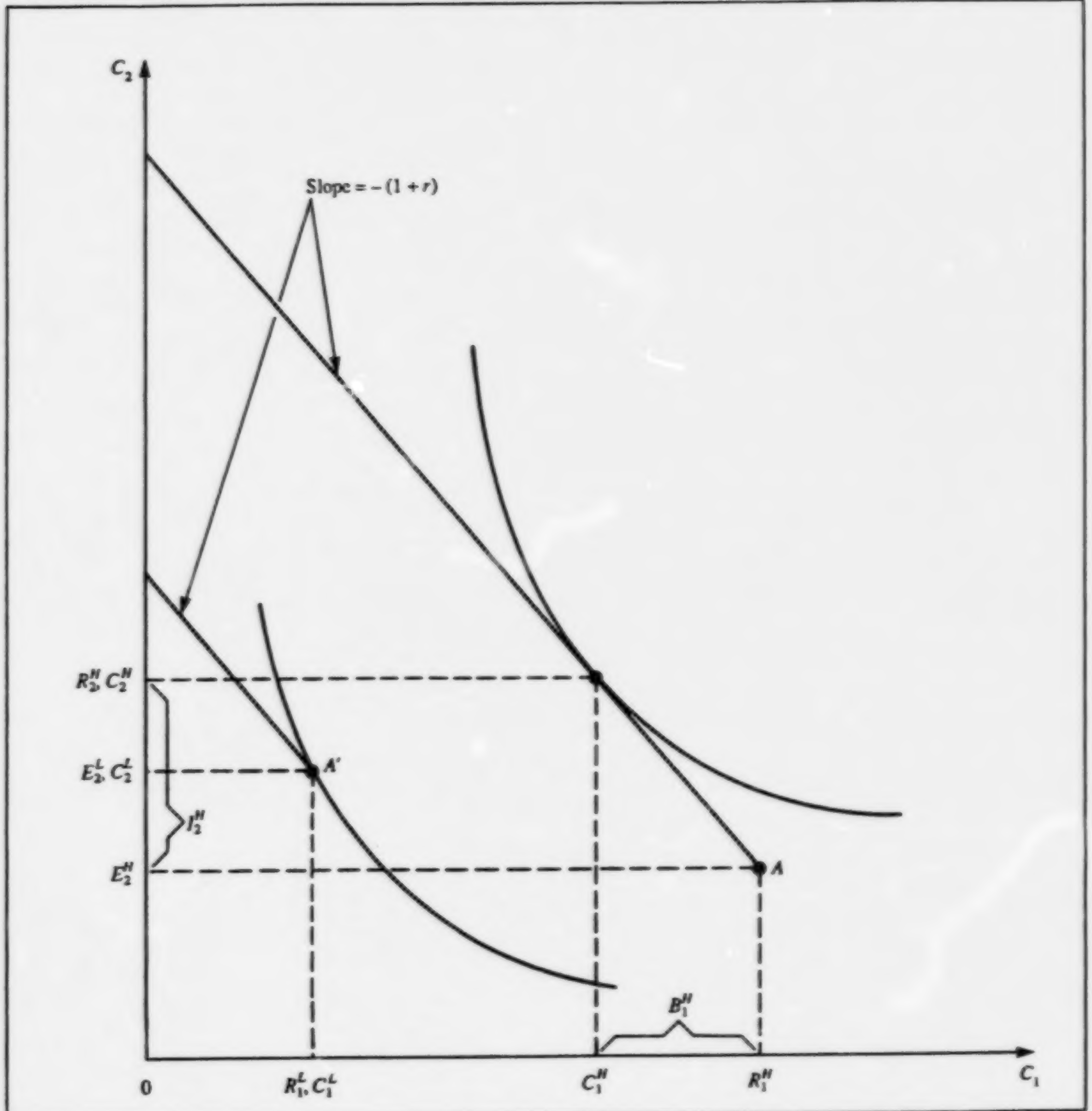

B_1
E_2^L
E_2^H
Slope = $(1 - \theta)$
R_1^{L*}
R_1^{H*}
R_1
$R_1 = \left(\frac{\theta}{1 - \theta}\right)\left(\frac{E_2}{1 + r}\right)$

parents, that is, a zero bequest, but a large positive bequest for the high-earning parents.

Turning now to the empirical evidence, note first that the pattern found in Figure 8-3 corresponds very well to what is in fact observed.[11] It is predicted that desired bequests for lower-earning parents ought typically to be zero, but desired bequests for high earners would be large and positive. Adding accidental bequests due to uncertain lifetime, a distribution of inherited wealth corresponding quite well to what is observed is generated. Bequests are small for the bottom part of the population, but bulk large at the top end (in relation to both parent's and child's income).

Figure 8-3

Alternative Equilibria in Altruistic Model of Bequests, with Fixed Human Capital



Considering the relationship between the model and observation in more detail, there has been considerable study of the link between parental income and bequest. Holding child's income constant, the marginal propensity to bequeath is found to be small, and, if anything, declining with income, for the bulk of parents. Menchik and David (1983), whose study makes use of the best available data,[12] find that it is not until the top quintile of parents that the marginal propensity to bequeath increases. Among the top quintile, bequest is very responsive to parental income. The various estimates of Menchik and David of income elasticities of demand for bequests in the top quintile range from 1.5 to 3.5. A similar pattern has been found by Tomes (1981) and by Menchik in earlier work.

The empirical work by Tomes and Menchik confirms that the gross evidence on the importance of bequest by parental income range is not a bad guide to the true underlying income elasticity of demand for bequest. As shown in the previous section, the crude correlation of the bequest ratio with income is very strong, and the ratio rises particularly quickly at the top end. The recent results of Tomes, Menchik, and others indicate that this is very likely a reflection of a high income elasticity of demand for bequests at high-income levels.

That the simple model of intergenerational transfers based on altruism can explain the nonuniformity of the income elasticity of demand for bequests is striking and important. Until the recent literature spawned by Ishikawa, Becker, and others, the rising bequest ratio was often taken as evidence that concern for one's heirs was simply a luxury. This was taken to imply that a reasonably realistic specification of preferences would be:

$$U = U(C_1, B_1), \tag{8.5}$$

where C_1 was a necessity and B_1, a luxury. Alternatively, it might be hypothesized that there were differences in tastes between high- and low-income families, the high-income families being more patient, taking a longer view, being more concerned about maintaining the family fortune, etc. An obvious advantage of the present model is that it does not require such differences in preferences to explain the observed behaviour of the bequest ratio. Whether the model is also superior to simply assuming bequests are a luxury depends on how well these two competing models predict other characteristics of bequest behaviour. As we shall see later, which model is actually more realistic does matter. There are quite different predictions about the effects of tax changes, particularly when it is recognized that bequests may take place in human as well as nonhuman form.

The gross behaviour of the bequest ratio and the income elasticity of demand for bequests are consistent with the predictions of either the objective functions 8.1 or 8.5. The two models can be distinguished, however, with respect to other predictions. As noted earlier, under homothetic preferences, for example, the model based on equation 8.1 predicts that the income elasticity of demand for bequests should be declining among those who make positive bequests – a prediction which Tomes found was confirmed in his data. More strikingly, Tomes has found strong evidence that bequests are negatively related to the incomes of offspring. This prediction emerges straightforwardly from equation 8.1 (see the bequest function 8.4), but the objective function 8.5 has no such implication.

Tax Effects

With children's human capital exogenous, the analysis of tax effects on bequest is relatively straightforward. Particularly simple to analyse are the effects of wage taxes, since these are lump sum with labour income exogenous. Estate taxes introduce distortions and can be analysed with the help of Figure 8-4. This analysis is sufficiently general for our purposes. In the two-generation framework, proportional wage and consumption taxes are equivalent and both identical to the Blueprints scheme. (Only proportional taxes are examined in this chapter.) The analysis of estate taxes allows us to discuss the effects of either extending a wage tax to cover inheritances as well or applying a consumption tax to bequests in addition to consumer expenditure.

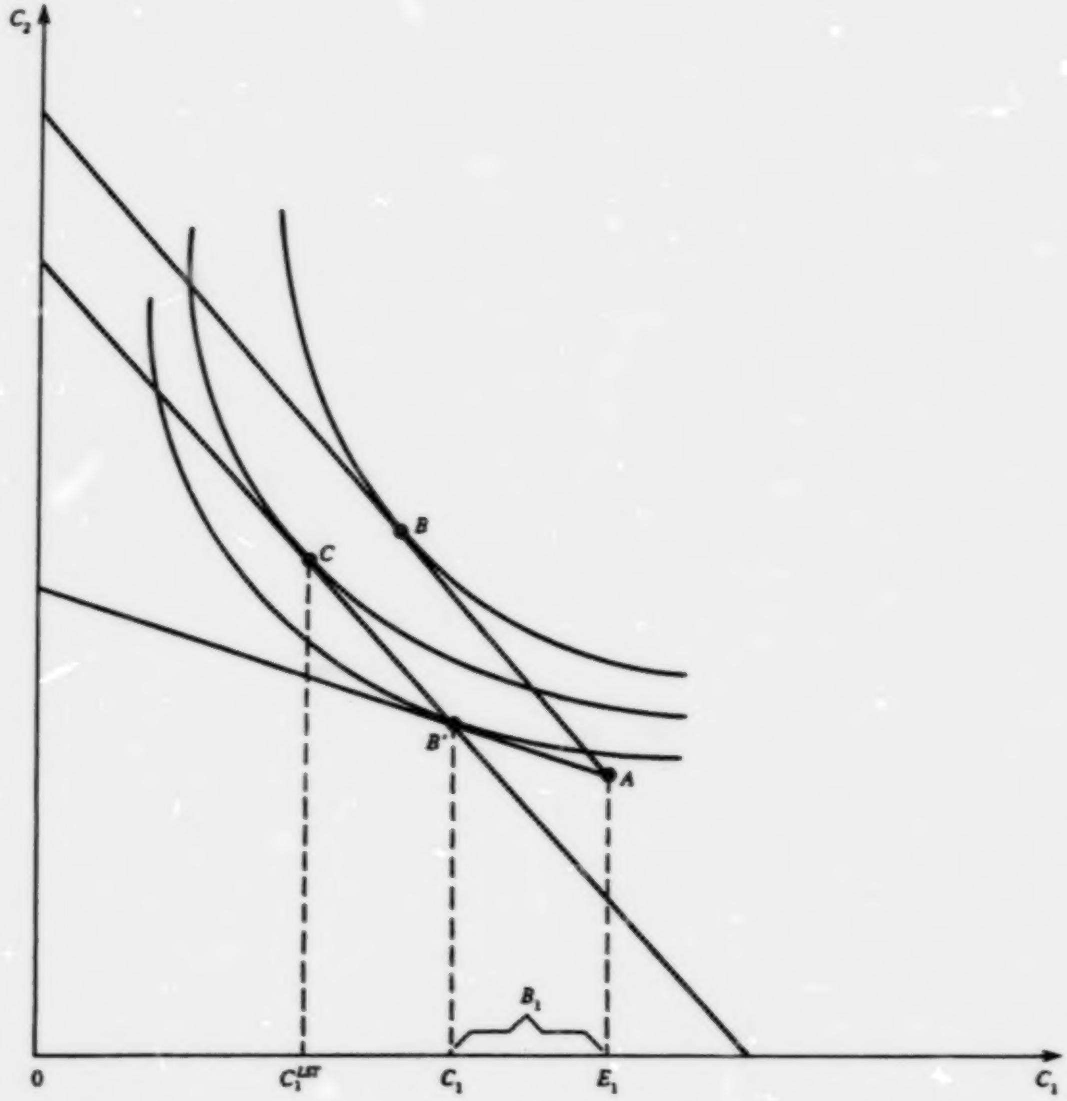
If R_1 were entirely composed of earnings, under homothetic preferences, a proportional wage tax on the earnings of both generations would simply lead to a uniform proportional "shrinkage" of budget constraint and choice variables in Figure 8-1 towards the origin. Thus B_1 and I_1 would unambiguously decline if initially positive, and remain at zero if initially at that level. At the other extreme, if $R_1 = I_1$ (zero earnings for the first generation), a wage tax would only reduce the earnings endowment, E_2. Parents would share in this misfortune by increasing bequest by $-\theta\Delta E_2$. Given that I_1/R_1 is generally larger for higher-income groups, this implies 1) that it is more likely that I_2 rise in response to a wage tax for the children of wealthy families, and 2) even if I_2 falls for the child of a higher-income parent, it will typically fall less, proportionally, than the I_2 of children from low-income families. The net result, even without any induced change in factor prices, would be an increase in income inequality for the children's generation.

In contrast to a wage tax, it might at first appear that a proportional estate tax would produce an unambiguously equalizing effect. In our two-generation framework, both I_1 and B_2 are larger, proportionally, on average in wealthier families. Thus, for either parents or children, it might seem that a proportional estate tax would have to be equalizing, at least in the absence of behavioural effects.

In fact, the distributional impact of an estate tax is not obvious, even in the simple two-generation framework.

Figure 8-4

Estate Tax Effects on Bequests, with Fixed Human Capital and Material Bequests Initially Positive



Although the model we have sketched produces a situation in which bequests rise as a fraction of income, this is only an average tendency. For parents with the same income, lower-earning children will receive larger bequests. The latter effect is equalizing. Clearly, for such children (i.e., with parents of the same income), in the absence of behavioural response, taxing bequests would be disequalizing. Without writing down a more explicit model, it is not clear whether this disequalizing effect of estate taxation is dominated by the equalizing effect referred to in the previous paragraph.

Figure 8-4 provides a diagrammatic analysis of behavioural response to an estate tax. For simplicity, this is assumed to impinge only on inheritances received by the young. As shown in the diagram, the estate tax produces a result analytically the same as that of an interest income tax in the two-period life-cycle model. The budget constraint rotates around the endowment point, *A*, to achieve a lower slope (in absolute value). An ambiguous effect on the size of bequests is produced. The analysis is similar to that of the effect of an interest income tax on first-period savings in the life-cycle context.

From Figure 8-4 it is evident that if, initially, a parent planned to make a zero bequest, this would continue in force if an estate tax were introduced. Thus the children of such parents are unaffected by the tax. In the case of positive bequest, there is a substitution effect acting to reduce C_2 and increase C_1, and an income effect that tends to reduce both C_1 and C_2, assuming both are "normal" commodities. Thus, although C_1 may rise or fall – which gives rise to the ambiguity concerning the change in the pre-tax bequest – consumption of children must decline. Thus inheritances received (after-tax) will decline for sure.

These simple conclusions suggest two observations that may be of some importance. The first is that, as in the analysis of the impact of interest income taxation on life-cycle saving, it is not clear whether estate taxes will reduce aggregate intergenerational saving. Thus it is possible that estate taxation might actually increase saving and (in a closed economy) capital formation, with favourable distributional effects via the wage-rental ratio. The second observation is that, since all inheritances received after-tax are reduced, the force of intergenerational accumulation at the family level is being sapped. As we see in a later section, this turns out to have important implications in a long-run analysis.

Partial Equilibrium Model of Bequest under Altruism, with the Child's Earnings Endogenous

The above discussion has assumed that children's earnings are exogenous. This is clearly an unsatisfactory assumption. Even in a model where parents could not affect children's earnings, if children invested rationally in their own human capital, changes in the interest rate, for example, would lead to changes in their earnings. These changes in children's earnings would affect an altruistic parent's bequest behaviour.

In this section we will make the extreme assumption, in common with the recent literature due to Ishikawa, Becker, Blinder, Menchik, Tomes, and others, that the human capital investment in a child is entirely paid for by parents, and that parents cannot reap any return for this investment. The extremity of this assumption is clear from the fact that it not only rules out debt-financed schooling by the child, but also loans from the parent to the child. Whatever the parent does to assist the child in human capital formation is a pure gift.

Under the above assumption, aside from some basic earning power that would be imparted by innate abilities, and investments made by the state, the entire income of the child is due to parental transfers. These take the form of material bequests, denoted B_1 as before, and expenditures on human capital formation, B_1^H. The latter may take the form of direct expenditures or one's own forgone earnings in helping the child to accumulate human capital. (The importance of the latter could conceivably be dominant.) The child's income becomes:

$$\begin{aligned} R^2 &= E_2 + (1 + \tilde{r}_H)B_1^H + (1 + r)B_1, \\ &= E_2 + I_2^H + I_2, \end{aligned} \tag{8.6}$$

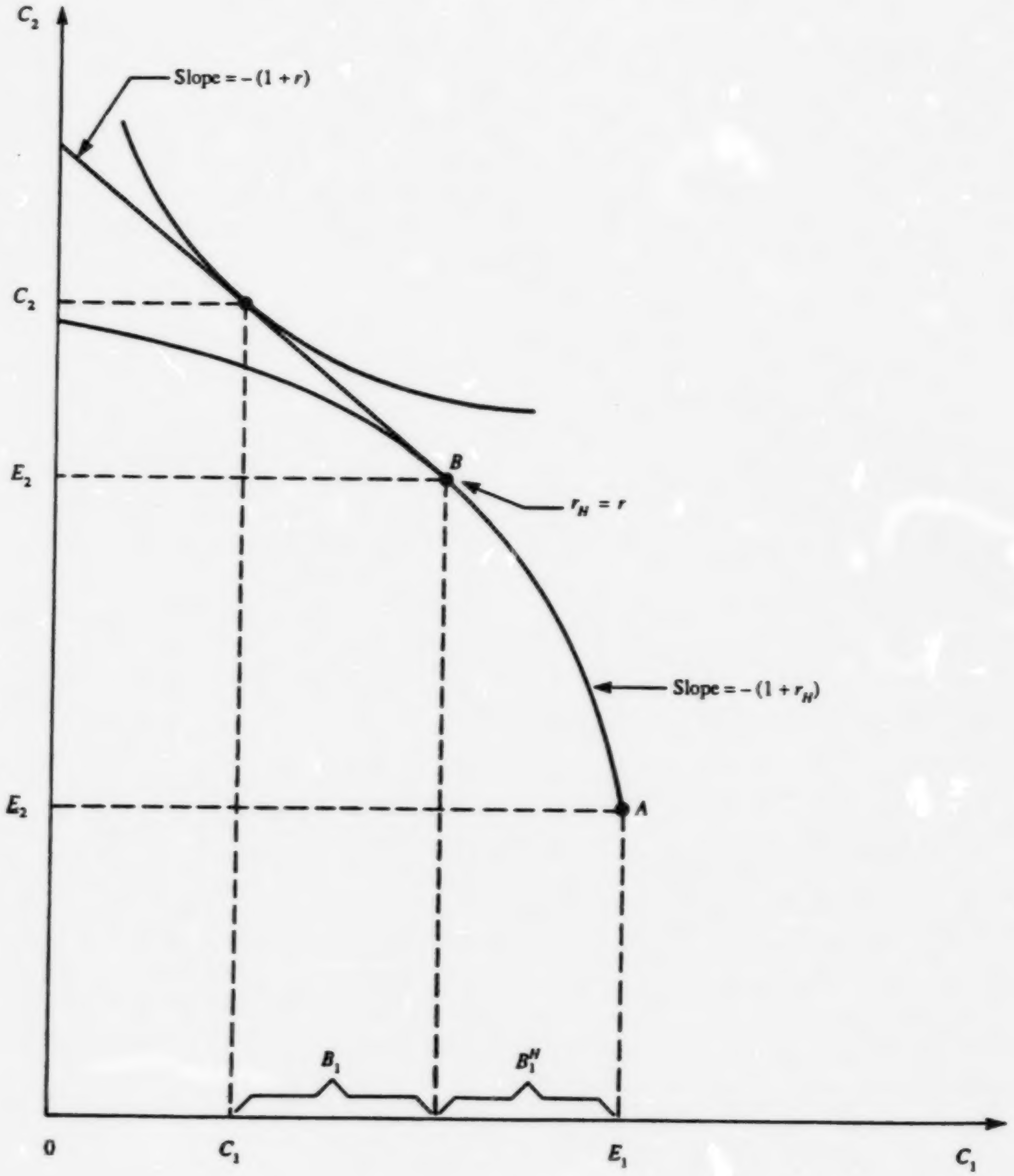
where E_2 is the endowed earnings ability of the child (i.e., not based on parental expenditure), $\tilde{r}_H$ is the *average* rate of return on human capital investment in the child, and I_2^H is the inheritance of human capital.

The parent's problem may still be stated formally as the maximization of equation 8.1 subject to equation 8.2. However, now it must be recognized that E_2 is not exogenous. Thus there is an extra constraint, which would be given by the human capital production function. Instead of writing this out, we turn to a diagrammatic treatment of the problem.

Figure 8-5 shows the problem parents face when the child's earnings are endogenous. There is again an endowment point, *A*, determined by the income of the parent and the child's endowed earnings capacity. However, in general it is no longer optimal to start at *A* and operate only in the nonhuman capital market. As observed in Chapter 6, the marginal rate of return on human capital investment, r_H, initially typically exceeds that on nonhuman assets. (Otherwise we would not observe any voluntary schooling.) Thus, one may move up quite a steep income opportunity locus from point *A*, as shown in the diagram. It is efficient to invest in the child's human capital, instead of nonhuman capital, as long as $r_H > r$. If the point *B*, where $r_H = r$, is reached, and further transfers to the child are desired, it is efficient to make these in nonhuman rather than human form. (Note that

Figure 8-5

Positive Bequests via Human and Nonhuman Capital



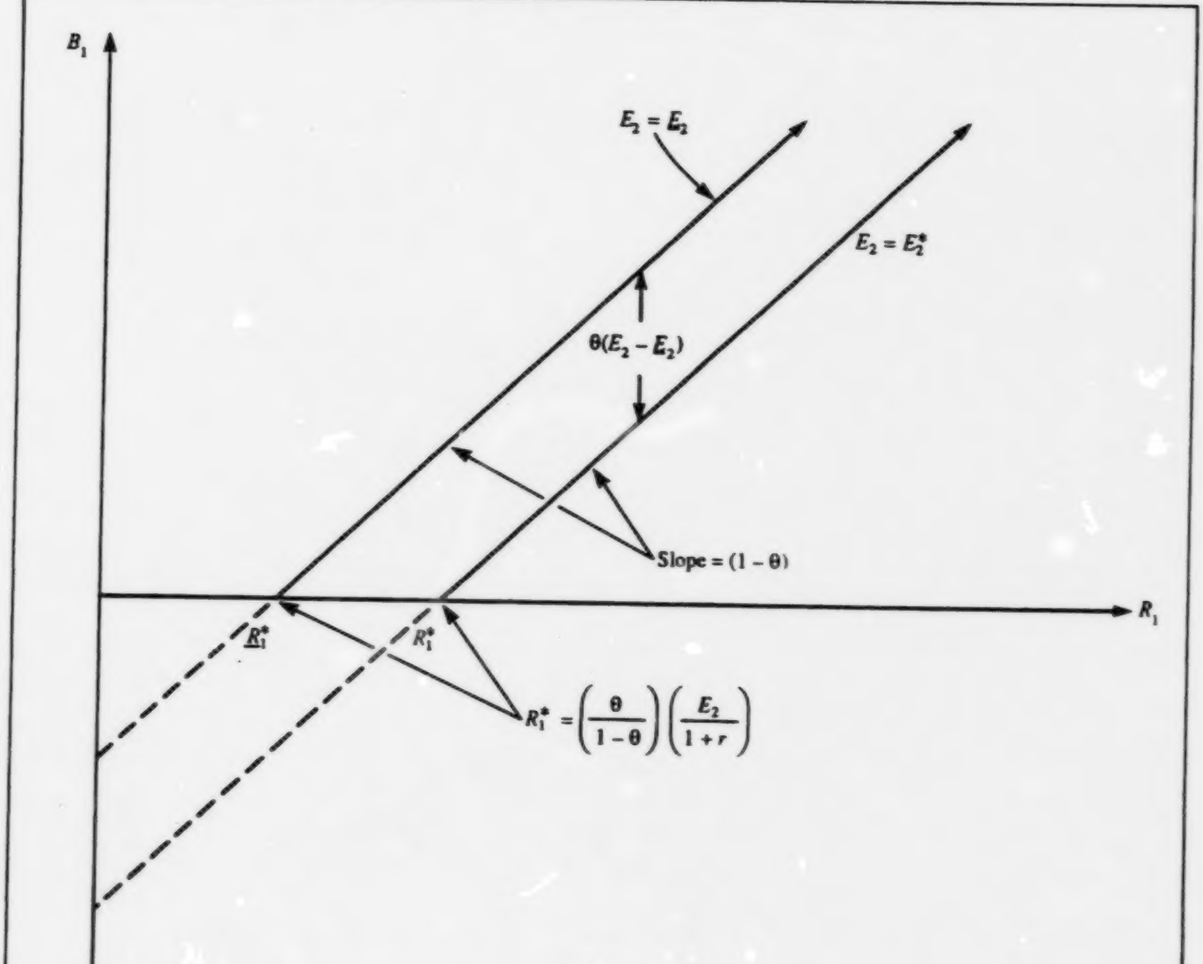
since we assume parents cannot reap any return from their investment in the child's human capital, it is not possible to move down a straight-line budget constraint from point *B*.)

In the case illustrated in Figure 8-5, positive B_1 is desired. Note that as long as B_1 is positive, B_1^H , and therefore E_2, will be invariant. Thus the analysis here is equivalent to that when E_2 was exogenous, as long as the interest rate does not change. That is, r being constant, optimal E_2 is fixed, so that the response of B_1 to changes in R_1, say, is qualitatively the same as if E_2 were fixed exogenously. This point is illustrated in Figure 8-6.

Figure 8-6 shows how endogenous human capital affects the bequest function. The upper function would be produced if E_2 were fixed exogenously at $\underline{E}_2$, and is the same as the bequest functions encountered in Figure 8-2. Now, we know that E_2^* rather than $\underline{E}_2$ will actually be obtained. This will shift the bequest function doen by $\theta(E_2^* - \underline{E}_2)$, as indicated in the diagram. (Refer to the bequest function as set out in equation 8.4.) Thus qualita-

Figure 8-6

Bequest Functions, with Endogenous Human Capital



tively we have the same bequest function as before. Once again we expect many families will have a zero desired bequest; the bequest ratio will be rising among those who have positive desired bequest; the income elasticity of demand for bequests will be declining among those with positive desired bequest; and bequest will be negatively related to the child's earnings, holding parental income constant. Thus the confirmation of the predictions of the earlier model with exogenous earnings that is found in empirical studies could be taken instead as confirmation of the model with endogenous human capital. This of course raises the issue of how to distinguish between the models.

Tomes (1981) found that the model with the child's human capital endogenous dominates the exogenous earnings model empirically. He noted that the model sketched above has quite different implications for human capital investments in children between the bequest at zero and positive bequest regimes. Referring to Figure 8-7, for example, for families initially at a corner, with bequest at zero, an increase in parental income will lead to desired increases in C_2 and the child's human capital (unless initial desired bequest is exactly zero, in which case human capital investment is already at the efficient level and will not be expanded). In contrast, as we have noted above, for families making positive bequests, a rise in R_1 should not alter E_2. Although R_1 should not influence E_2 among families with positive bequest, Tomes argues that indicators of greater parental efficiency in investing in kids' human capital, such as parents' years of schooling, should have a positive influence on E_2. Finally, one might expect that, for families making a zero bequest, the number of children would have a negative effect on E_2. (The more children there are, the less parents can "afford" to spend on each child's education.) This also contrasts with the positive bequest regime, where E_2 is always at the efficient level, that is unaffected by "opportunity variables" like parental income or number of siblings.

The predictions of the previous paragraph provide a means of distinguishing between the child's earnings exogenous and endogenous models of the previous and present sections. In confirmation of these predictions, Tomes finds that parental income indeed has a significant positive effect on years of schooling for the zero bequest families, but an insignificant effect among families making positive bequests. However, holding parental income constant, the parent's education has a significant positive effect on the child's education in both regimes. Thus, holding parental efficiency in human capital investment (i.e., parental schooling) constant, the parent's income has no effect on the child's schooling where bequests are positive; but holding income constant, the parent's schooling has a positive effect. This is quite striking. It might be expected that both parental income and education would have a strong positive effect on the child's education across all income groups and throughout the population. The only prediction cited above that distinguishes between the child's income exogenous and endogenous assumptions, which is not confirmed in Tomes (1981), is that concerning family size. Contrary to the theoretical prediction, family size has an insignificant effect on the child's years of schooling in *both* the zero and positive bequest samples. Thus there is some need for caution in the application of the model we have considered here.

Tax Effects

As in the exogenous earnings case, a proportional wage tax is very easy to analyse as long as the full private costs of human capital investment are forgone earnings costs and all I_1 are zero. In that case, all the magnitudes in Figure 8-5 simply shrink in proportionally towards the origin, and all relevant decision variables are left undistorted. Thus private human capital investment falls, but only in terms of cost. Length of schooling or human capital *formation* is unaffected. In families where bequests were previously desired, they will be reduced by the same percentage – equal to the proportional rate of the wage tax.[13] The distributions of income and consumption among children have the same shape as in the absence of the tax – in relative terms inequality will not change at all.

While the $I_1 = 0$ case with forgone earnings dominating schooling costs may be an adequate approximation for a large part of the population, even where $I_1 = 0$ there will in general be significant direct costs of schooling. Where lengths of schooling are greatest, these costs may be particularly important. The presence of such costs implies that the wage tax will reduce the rate of return on investments in the child's human capital, decreasing the efficient level of the child's schooling and, therefore, E_2 where positive bequests are made, but also reducing schooling where bequests are zero (under the homotheticity assumption). These conclusions are illustrated in the two panels of Figure 8-8.

The first panel of Figure 8-8 shows the impact of a proportional wage tax when there are direct costs of schooling and bequests are initially positive. A decline in the efficient level of human capital investment can be inferred from the fact that the after-tax rate of return on human capital, r_H, will be equated to the undistorted rate of return on nonhuman capital, r. (If human capital investment did not decline, we could have $r_H < r$, given positive direct costs of schooling.) Note, however, that

Figure 8-7

Bequests via Human Capital, with Nonhuman Bequest at Zero

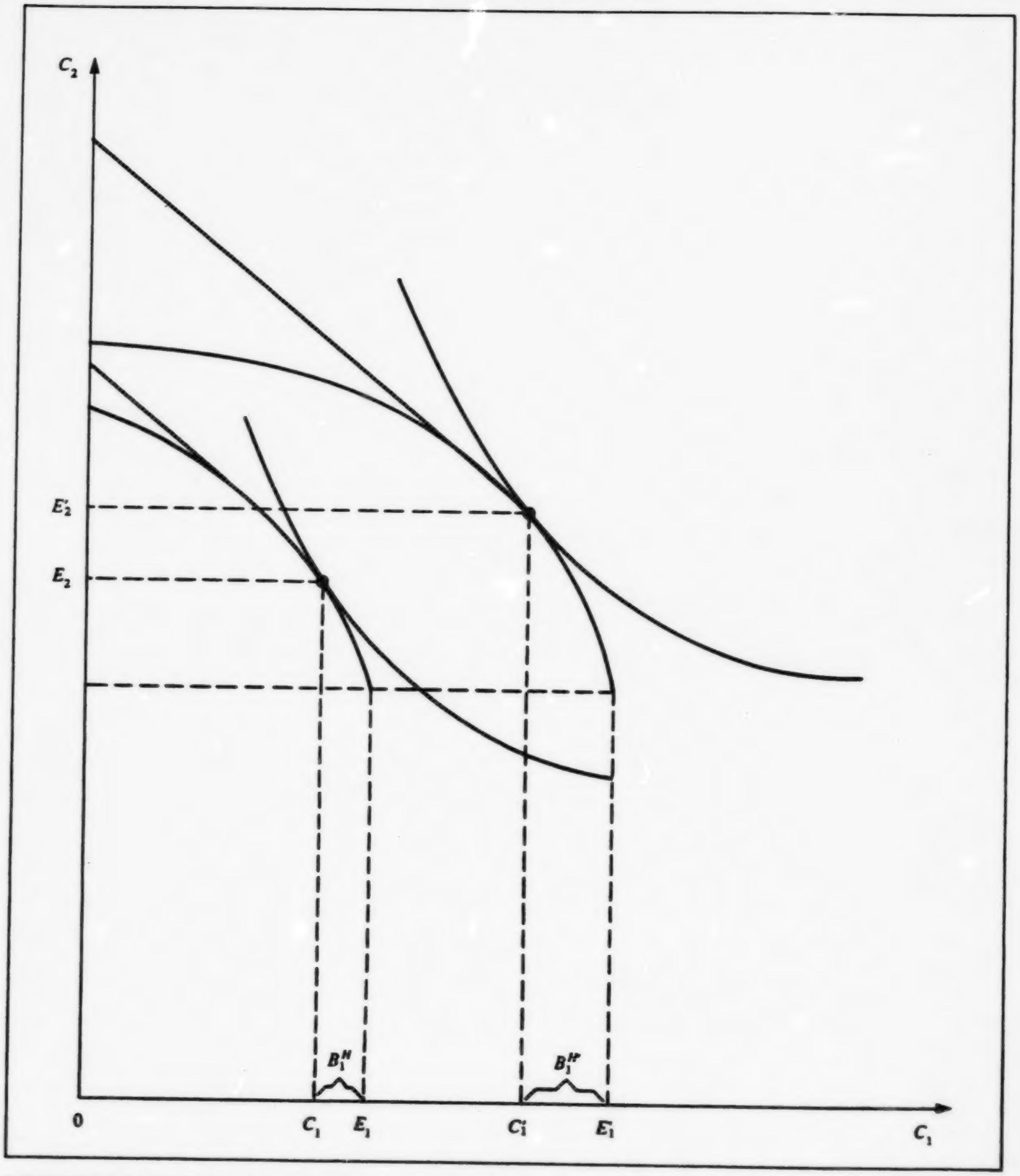
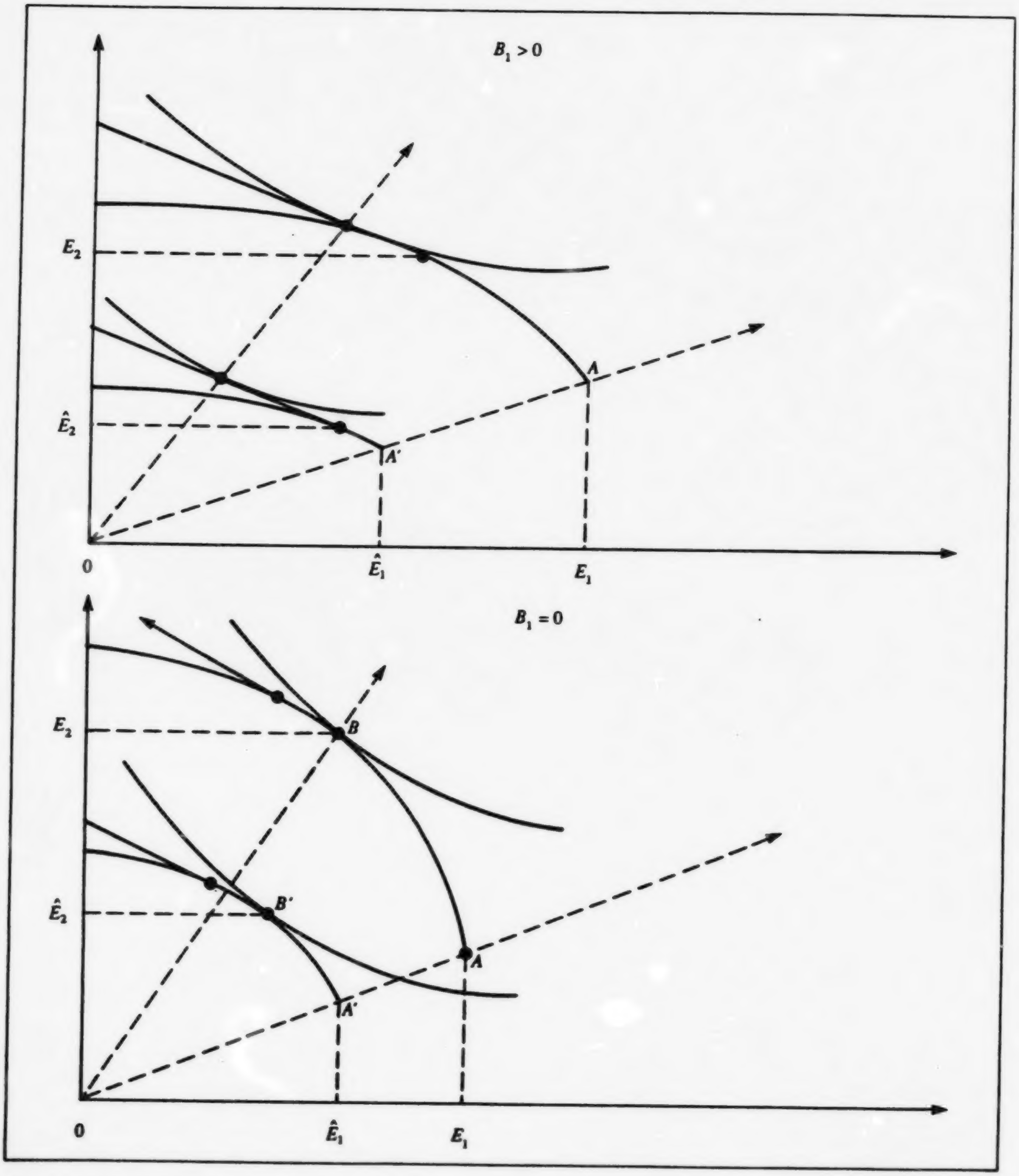


Figure 8-8

Wage Tax Effects with Human Capital Endogenous and Direct Costs of Schooling



C_2/C_1 does not change, under our assumption of homotheticity. This implies that in relation to the after-tax resources of parents, B_1 is now larger (B_1/R_1 is higher than before), as is the ratio of inheritance to earnings for children, I_1/E_1. Thus the wage tax induces a substitution away from intergenerational transfers in human form, which are effectively becoming more expensive, towards transfers in nonhuman form whose cost has not changed. The opportunity to perform this substitution allows families making bequests, that is, mostly wealthier families, to escape some of the impact of the proportional wage tax.

Families that do not initially desire a positive bequest face the situation illustrated in the second panel of Figure 8-8. The case illustrated is one where zero bequest is still obtained after the tax change. (A case with a switch to positive desired bequest could be set up, as is evident from the diagram.) Due to the declining rate of return to human capital, in the presence of direct costs, we know that tangency between an indifference curve and the after-tax earnings possibility locus must occur on a ray from the origin with lower slope than that on which C_1,C_2 was located in the no-tax case. Thus C_2/C_1 is reduced below the original value. The attempt to escape the impacts of the wage tax takes the form of a substitution away from the child's consumption, which has effectively become more expensive (from the parent's point of view), towards the parent's consumption, whose cost is unchanged. This necessitates a decline in human capital formation of the child.

The fact that C_2/C_1 is unchanged in families where bequests are positive, whereas it declines in families making zero bequests, means that inequality will increase for the younger generation as a result of a proportional wage tax (although in terms of the distribution of consumption it may *decrease* among parents), in the case where all $I_1 = 0$.

Finally, a discussion of wage tax effects must also consider the case of families where much of R_1 is composed of I_1. To take an extreme case, assume that $R_1 = I_1$ and that (necessarily) the only costs of schooling are direct costs. Then the rate of return on human capital investment declines, and less will be bequeathed in this form. However, as in the first panel of Figure 8-8, C_2/C_1 does not change. For every wealthy family, the reduced net earnings of the child will reduce dynastic resources very little. Thus C_2 will decline less, on average, for genuinely wealthy families than for the merely well-to-do. This influence is clearly disequalizing for the distribution of income or consumption among the members of the younger generation.

In conclusion then, a wage tax likely has a disequalizing impact when human capital is endogenous, as it did in the earnings exogenous case. In both cases, families where the parent's income is more largely made up of inheritance rather than earnings obviously have an advantage, from which children will benefit, when a wage tax is imposed. This is disequalizing. However, the ability of those families for whom positive bequest makes sense, to substitute away from human, towards nonhuman, transfers introduces a further advantage for higher-income families.

Finally, the effects of an estate tax when human capital is endogenous can be discussed with the help of Figure 8-9. Clearly, only those who initially desire positive bequests are affected. As indicated in the diagram, they will invest more in the child's human capital when the estate tax is introduced. Since the child's consumption, C_2, and R_2 must decline, this makes it highly likely that B_2 will generally fall.[14]

Thus when human capital is endogenous, a likely effect of estate taxation is to increase aggregate human capital formation and reduce saving in the form of nonhuman wealth. This implies an interasset distortion similar to that discussed in Chapter 6, unless there is underinvestment in human capital, in which case the effect could be welfare-improving.

As in the previous section, without writing down a more specific model it is not possible to say whether inequality will rise or fall as a result of estate taxation. However, the ability of parents making positive bequests to substitute out of physical and into human transfers implies that their children will suffer less, given any *rate* of estate taxation, than when human capital is exogenous. Since large positive bequests are most important among the wealthy, this may imply that estate taxation is less equalizing when human capital is endogenous.

Alternative Partial Equilibrium Models of Bequest

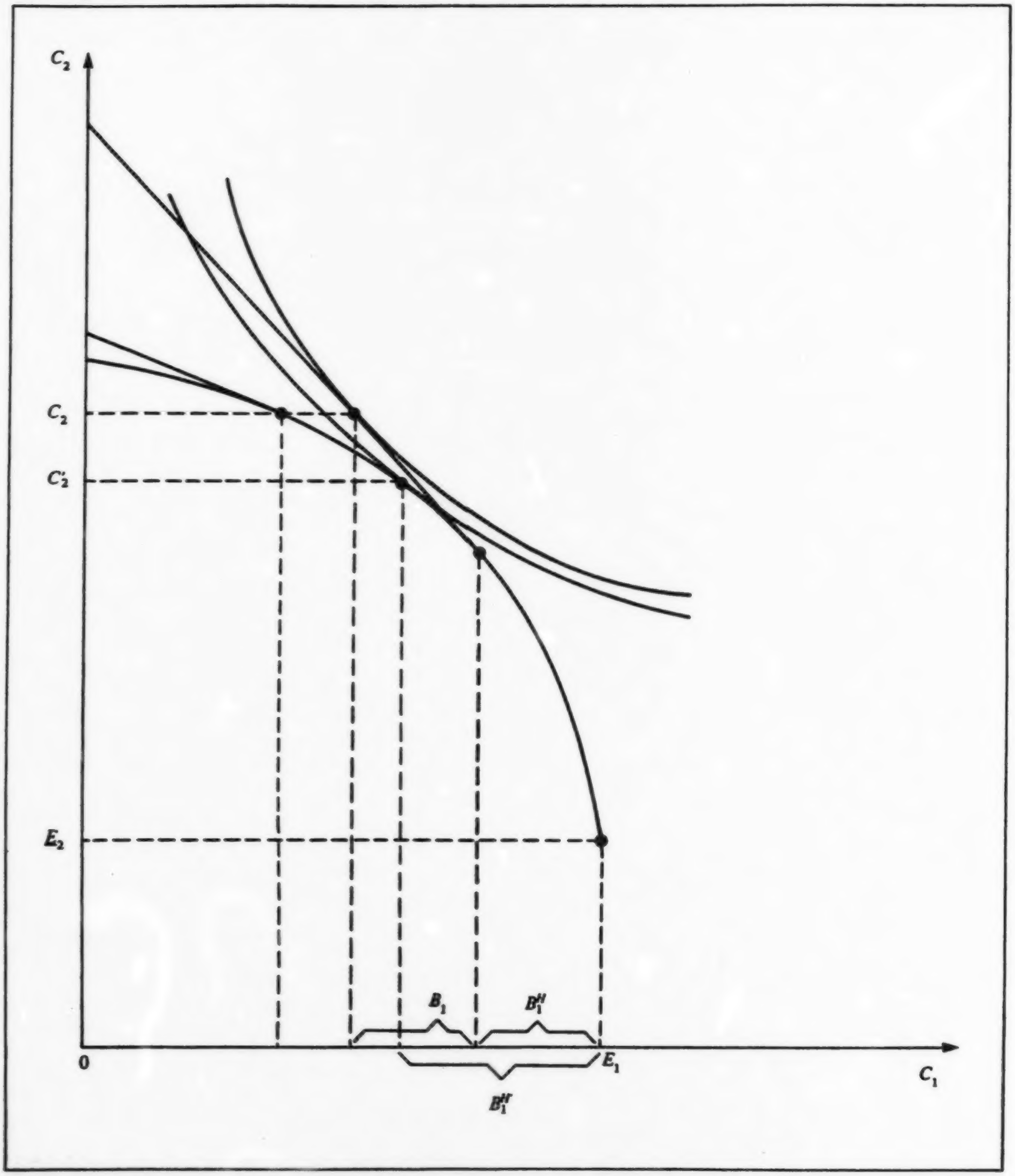
As indicated earlier there is far from unanimous agreement that the altruistic model of bequest behaviour sketched in the previous two sections is the most relevant. Important alternative models include the "utility of terminal wealth" view of equation 8.5 above, the accidental bequest view, and the possibility that wealth is accumulated because it generates *prestige* or *power*. These are considered here in turn.

Utility of Terminal Wealth

The view that people make bequests because the latter are simply "in the utility function" is unsophisticated to

Figure 8-9

Estate Tax Effects on Bequests, with Human and Nonhuman Bequests Initially Positive



say the least. Nonetheless the objective function 8.5, $U = U(C_1, B_1)$, crops up frequently in applied work, and its implications should, therefore, be considered carefully.

As noted earlier, under equation 8.5, the observation that bequests are a luxury has no *explanation* – it is merely viewed as a fundamental characteristic of preferences. That the altruistic model predicts bequests to be a luxury, when concern for heirs is not any greater at higher levels of income, appears to make it a more interesting model. It is also, of course, much richer. It implies, for example, that bequests should be negatively related to the child's income, that the observed income elasticity of bequest should be low for the bottom half or so of parents (arranged by income) and much higher at the top end, and even, as we have seen, that the determinants of human capital investment should differ between individuals receiving and those not receiving bequests. Since all the latter predictions have been confirmed (with varying degrees of confidence) in empirical work, the "altruistic" objective function, $U = U(C_1, C_2)$, appears to dominate $U = U(C_1, B_1)$. However, there is at least one disquieting observation that calls into question the altruistic model.

The one observation that is most perplexing, from the viewpoint of the altruistic model, is the infrequency of unequal division of bequests between siblings. Although Tomes (1981) found considerable unequal division (as well as evidence that this was related to the desire to *compensate* lower-income heirs), further work on the underlying data, by Menchik, calls into question these conclusions. Also, alternative data sets indicate that *equal* division of estates in the United States is the rule rather than the exception (Menchik, 1976). Although numerous hypotheses of how equal division is consistent with compensatory bequests have been suggested (compensation may occur mainly via gifts *inter vivos*; heirs may redistribute bequests among themselves to achieve greater equity, etc.), the prevalence of equal division of estates remains a challenge to the altruistic model of bequests.

It is interesting to note that the "utility of terminal wealth" view errs in a manner analogous to two-period life-cycle models with enforced retirement in the context of interest rate effects on savings. As discussed in Chapter 4, the latter err in ignoring the human wealth effect identified by Summers (1981), under which a decrease in the rate of return tends to discourage saving on account of the increase in the discounted value of human wealth occasioned. In the bequest context, $U = U(C_1, B_1)$ is obtained as a special case of $U = U(C_1, C_2)$ if $E_2 = 0$. That is, it is analogous to enforcing retirement in the second period. A model using $U = U(C_1, B_1)$ will, therefore, tend to understate the decline in intergenerational saving that may result from an estate tax. This point is of some relevance in the evaluation of recent work, as discussed in the next section.

"Accidental" Bequests

In a world of uncertain lifetime and imperfect annuity markets, bequests would be observed even if there were no bequest motive for saving. It has often been suggested that the bequests generated in this way would be quite sizable. This is a difficult claim to assess. However, some insight is provided by the results of Davies (1981), as pointed out earlier.

Davies asked to what extent the frequent observation of continued saving, or low dissaving, among the elderly could be explained by a combination of uncertain lifetime and the absence of annuity markets. In a central case it was found that while the predicted rate of decumulation for those aged 65-85 averaged 9.0 per cent under certainty with the pure life-cycle model, this rate fell to 3.7 per cent with the introduction of uncertain lifetime. This implies that the elderly would have considerably more wealth on hand at any point than if their lifetimes were certain. However, they would still be dissaving at a significant rate, so that the typical accidental bequest produced would be smaller than in the real world, where dissaving by the elderly occurs at a lower rate.

Prestige and Power

A model of bequests as the by-product of wealth accumulation initiated by the desire for prestige or power is not entirely implausible. Once again, the only way to tell whether such a model is of any relevance is to see whether it makes different predictions from other models, in particular the altruism model, and to check these predictions against the facts.

It must be noted, first, that the mere fact that wealth may generate utility directly does not imply positive bequests. With certain lifetime, for example, the optimal policy would still be to consume all wealth before death – as in the pure life-cycle model. Consumption would increase very rapidly at the end of the lifetime. Needless to say, this hardly corresponds with what is observed.

While the evidence that bequests are related to heirs' characteristics, from the work of Tomes, rejects the model of wealth accumulation for its own sake, as well as the simpler model of accidental bequests, it is worth noting that it may not be inconsistent with another version of the "prestige and power" explanation for bequests recently explored by Bernheim, Shleifer, and Summers (1985). Bequests may be viewed as "strategic." That is, they provide (delayed) payments for "child services" – for example, remaining in the family business, visiting parents, behaving in an acceptable manner, etc. – where these payments are the outcome of a "game" played between nonaltruistic parents and their equally selfish children. Such payments would clearly be expected to be related to heirs' characteristics. However, the relationship would likely differ from that posited in the altruism model. For example, bequests need not appear compensatory. They will only be so if more lowly endowed offspring for some reason succeed in exacting higher payments from their parents than do the better-endowed children. That there is no obvious reason to expect this may be an advantage of a strategic model of bequests over the altruistic model. As we have seen, one of the failings of the latter is to explain the frequency of departure from compensatory bequests, for example, in the form of equal division.

Aside from curiosity value, a strategic model of bequests may be important since, unlike other nonaltruistic explanations for bequest, it implies a behavioural response to estate taxation. That is, under strategic bequests, estate taxation is not a lump sum and may fail to have the attractive properties it would have if bequests were simply accidental. The reason is that a tax on bequests increases the relative price of child services, to the extent that these are purchased via a bequest. If gifts and bequests were subject to an integrated tax, and evasion were sufficiently difficult, this could result in important induced changes in behaviour.

Dynamic Partial Equilibrium Modeling

The two-generation partial equilibrium modeling discussed above has the merit of analytical simplicity and has had considerable influence in the literature. Also, as a guide to the impact over the first generation or two after an unexpected major tax reform it may not be too misleading. Since a generation or two covers a period of, say, 25-50 or 60 years, this means that for many observers it will appear to look sufficiently far into the future. Society will have changed so much in 50 and 60 years, it might be argued, that tax reforms enacted now will hardly continue in force that long. Longer-term analysis could, therefore, appear to lack interest.

Despite the above argument, major features of the tax regime do remain in place for very long periods of time. Tariffs seem to have been with us forever; excise taxes and duties for almost as long; and personal and corporate income taxes have been in place for a long time and seem to be regarded as permanent. Also, the various transfer programs forming the foundation of the welfare state appear widely expected to remain in force permanently. Thus the long-term implications of fiscal reforms may turn out to be of some interest – albeit after many years have passed.

There has been considerable recent work in modeling the equilibrium distributions of income and consumption in models incorporating intergenerational transfers (Loury, 1981; Laitner, 1979*a* and 1979*b*; Becker and Tomes, 1979; Ioannides and Sato, 1982; Ioannides, 1983; Davies, 1986; Davies and Kuhn, 1984 and 1986). There are two main approaches in this literature. Loury and Laitner, for example, consider dynastics in which the intergenerational utility function is expanded to depend on the consumption of all future generations:

$$U = U(C_0, C_1, \ldots, C_t, \ldots). \tag{8.7}$$

Earnings evolve from generation to generation via a stochastic mechanism. Each generation is assumed to know its own earnings but to have imperfect knowledge of future endowments. The result is a pattern of bequests that displays some of the features we have examined above, on account of the incorporation of regression to the mean in earnings and intergenerational altruism.

Models like those of Loury and Laitner are far from having a closed-form solution. The properties of an equilibrium distribution of income or consumption are hard to characterize.[15] To a large extent the end result of a good deal of hard mathematics is simply the proof that equilibrium exists.

Models that are much more easy to work with than those of Loury and Laitner can be obtained by treating the objective function differently (and from some points of view less satisfactorily). Instead of moving to the infinite horizon, as in equation 8.7, we may simply reinterpret equation 8.1 as:

$$U_t = U(C_t, R_{t+1}). \tag{8.8}$$

That is, the utility of parents depends on their own consumption, as before, but on the child's *income*, rather than consumption. Such a model is just as admissible as that generated under equation 8.7, but it may be viewed as less elegant. In any case, the predictions obtained with equation 8.8 do not appear to be at odds with those obtained by Loury and Laitner.

The objective function 8.8 has been considered by Becker and Tomes; Ioannides and Sato; and Davies and Kuhn. The payoff is that it is possible to examine many more interesting issues, other than the mere existence of equilibrium. Becker and Tomes, for example, examine the influence of heritability of abilities, the degree of altruism, and linear redistributive tax-transfer mechanisms on both equilibrium inequality (as represented by the coefficient of variation) and intergenerational mobility. Ioannides and Sato have examined similar issues. Davies and Kuhn have generalized the discussion of the impact of redistribution, obtaining proofs which hold for a broad class of inequality measures, considering the transition from one steady state to another, and looking at various tax options aside from those considered by Becker and Tomes.

Aside from existence, Laitner has proven a result that is of considerable interest here. This is that the equilibrium coefficient of variation of consumption within a generation, which is constant, is *lower* than the coefficient of variation of earnings. Since the intragenerational distribution of consumption would be the same as that of earnings if inheritance were prohibited, this says that inheritance is an equalizing institution. Davies (1986) demonstrated that the same result holds in the model of Becker and Tomes (1979).

That inheritance should be equalizing in the type of model considered is, on reflection, not surprising. Intergenerational transfers are used to achieve "consumption smoothing" across generations within each dynasty. Thus consumption will be considerably less volatile than earnings. It will never reach the extreme upward and downward peaks displayed by earnings. In other words, there will be less inequality in the distribution of consumption (which is what counts for welfare) than in the distribution of earnings. Inheritance is thus an equalizing institution according to this model.

If inheritance is, on the whole, equalizing, the question arises of whether there is *any* benefit from interfering with inheritances, say, by levying an estate tax and redistributing the proceeds to the poor. One may even worry that the net result of such redistribution might be to *increase* intragenerational inequality.

Both Becker and Tomes (1979) and Davies (1986) have asked whether a linear redistributive tax-transfer scheme levied on lifetime income would increase or reduce equilibrium inequality in intergenerational models with the utility function 8.8. Becker and Tomes demonstrated the possibility of a disequalizing effect. Using an example of the model with specific functional forms, Davies shows that this is unlikely to occur, with plausible parameter values, unless either the interest rate or the intergenerational elasticity of substitution in consumption are higher than appears realistic.[16]

Davies and Kuhn (1986) have taken this literature a step further by modeling the transition between steady states with varying degrees of redistribution of lifetime income. They find that in all cases, irrespective of whether steady-state inequality rises or falls in response to an attempted increase in redistribution, the short-run impact of an increase in redistribution is a decline in inequality. However, it is also found, in illustrative computations, that the short-run equalization is followed, after a few generations, by steadily rising inequality, converging to the new steady state. This is a classic "overshooting" result. Even if steady-state inequality is going to decline in response to increased redistribution, the short-run drop "overshoots," so that a long period of rising inequality is encountered.[17]

If the transitional response to increased redistribution modeled by Davies and Kuhn has some real-world relevance, the implications may be quite disturbing. If we view the welfare state as having been in force in countries like Canada, the United States, and the United Kingdom for a couple of generations already, we might speculate that the period of declining inequality in response to increased redistribution is perhaps over or coming to an end. (Becker and Tomes pointed out, for example, that observed inequality in the United States does not seem to have fallen much over the postwar period despite apparently increasing redistribution.) If so, we may be destined to see inequality increase for a long period of time. The reaction to this may well be a call for increased redistribution, which will work in the short run but only exacerbates the problem in the long run according to the model.

General Equilibrium Modeling of Tax Reform Options with Bequests

Another recent strand of literature, still in its infancy, has incorporated bequests in simulation models related to those of Summers and Auerbach, Kotlikoff, and Skinner (AKS), discussed earlier in Chapter 4. These models examined the welfare gains from consumption and/or wage tax reforms, in models which use a pure life-cycle saving formulation.

Seidman (1983 and 1984) incorporates a bequest motive using the utility function 8.5 in a model otherwise similar to Summers. In Seidman (1983) he then examines the steady-state changes in capital stock which occur in the change from an income tax to various expenditure (ET) and wage tax (WT) alternatives. Alternative expenditure taxes that either exempt or tax bequests are examined. Likewise, wage taxes either exempting or taxing inheritances are studied. In computing steady states it is required that the flow of bequests, as well as all other relevant magnitudes, should grow at the constant rate of balanced growth.

The principal conclusion of Seidman (1983) is that the type of "consumption tax" which is adopted has a major effect on the steady-state value of the capital/labour ratio. In order of this ratio, from the highest capital intensity to the lowest we have: 1) ET exempting bequests; 2) ET taxing bequests; 3) WT exempting inheritances; 4) WT taxing inheritances; and 5) current income tax (IT) regime. In light of the results of Summers, and others, which produce an ordering ET, WT, IT when bequests are absent, these results are perhaps not surprising. They indicate that in a model with a bequest motive, taxation of bequests or inheritances reduces saving. While perhaps not surprising, this may be an important point, especially in view of the Summers and AKS results indicating that the WT option produces a small welfare gain relative to the ET option, and the relatively small ET gain obtained by AKS. Taking bequests into account, if the goal is to continue to tax on a lifetime income base, the resulting drop in capital accumulation will reduce the steady-state welfare gains from both ET and WT reforms.[18]

Seidman (1984) extends the above analysis to deal with the transition between steady states. Only the replacement of an income tax by a consumption tax is modeled. What is found is an effect that, in contrast to Seidman (1983), makes ET reform look more attractive than in AKS. Recall that AKS found significant welfare losses for cohorts aged more than 38 in the transition to a new ET regime. These losses resulted from the relatively high consumption planned in retirement in the strict life-cycle model. With a bequest motive, Seidman gets smaller consumption in retirement and, therefore, a less dramatic windfall loss for older cohorts present at the time of the policy change. This makes ET reform appear somewhat more attractive.

Ballard (1983) has also incorporated a bequest motive in a life-cycle simulation. His model contains considerably greater detail and a more realistic modeling of earnings, taxes, etc., in the U.S. economy than is found in the Summers-AKS-Seidman literature. Like Seidman, Ballard finds that the bequest motive alters patterns of consumption sufficiently to greatly alter the distributional impact of consumption tax reform. In fact, in all his simulations Ballard finds that *all* cohorts present when the consumption tax is introduced benefit. Needless to say this is a result dramatically different from that obtained by AKS.

Summary

This chapter has covered considerable ground. A few years ago so much attention to intergenerational transfers in a discussion of capital income tax reform might have appeared misplaced. Today, despite the continuing questioning of the Kotlikoff and Summers claims, there is sufficient evidence of the quantitative importance of bequests, and enough interest in the broader intergenerational links via human capital as well as nonhuman capital, for such a discussion to be recognized as essential.

Unfortunately, as we have seen, there is no agreement on the "true" model of intergenerational transfers. A model based on parental altruism has much intuitive appeal and generates rich predictions under simple assumptions, but there is some dissatisfaction with this model on empirical grounds. In particular, the compensatory element in bequests appears to be much weaker than predicted. Alternative models, which explain much of the observed bequests as the "accidental" result of pure life-cycle saving in a world with uncertain lifetime and imperfect annuity markets or wealth accumulation to achieve prestige and power, have won adherents. These models do not offer predictions as rich as those of the altruism model. Their main testable implication is that bequests should not be related to the characteristics of heirs. Although bequests are not related to heirs' characteristics precisely as predicted by the altruism model, there is sufficient evidence of significant effects to cast doubt on models which suggest that bequests are essentially unintended. Nonaltruistic models in which heirs' characteristics matter have been developed. For example, bequests may be viewed as strategic payments for "child services," and one would expect that payments would then be related to heirs' characteristics.

If bequests were unintended by-products of wealth accumulation for other reasons, their inclusion in the consumption tax base (or inheritances in the wage tax base) would be very attractive. The element of these taxes falling on intergenerational transfers would be lump sum, and the distributional implications would appear favourable. (Horizontal equity might also be regarded as improved, from the standpoint of many observers. However, others might regard exclusion of bequests as more equitable. See the discussion in Chapter 3.) However, if the altruism model is correct, there is an important question as to whether this approach is desirable on efficiency or distributional grounds.

As we have seen, in the short run, taxing bequests affects not only the total flow of transfers but also the choice between human and nonhuman transfers. Aggregate human capital formation is likely to increase, while the stock of physical capital will likely decline. The worst case would be that of a closed economy where there was no concern over possible underinvestment in human capital. In that case, the reduced aggregate saving and investment would likely be welfare-reducing (since we are likely below the golden-rule capital intensity – see Chapter 4), and the impetus to human capital investment at the expense of nonhuman capital investment would be distortionary. However, in the open economy, reduced saving would not affect capital intensity, and there may be a problem of underinvestment in human capital (see Chapter 6). Thus, even in the altruism model, it is not clear that bequest taxation can be attacked on efficiency grounds.

Distributional results are also difficult to predict. Since inheritances and bequests are proportionally much more important for high-income groups, their taxation might be expected to be strongly equalizing. However, the taxation of bequests could theoretically increase inequality in the long run. In the altruism model, inheritances play a consumption-smoothing role across generations which is equalizing in the steady state. Interference with bequests may lead to a new steady state where equilibrium inequality is higher, since consumption smoothing via inheritance is weaker. Whether or not the new steady state produced by taxing bequests displays more or less inequality than the initial steady state, recent work shows it is likely that inequality will initially decline quite sharply for several generations, which may be sufficient to reassure those who would otherwise opt to tax bequests on distributional grounds.

Conclusion

In view of the growing evidence of the quantitative importance of bequests, the effects of tax reform on intergenerational transfers should not be ignored. Our discussion has indicated that, while the evidence is not conclusive, there appears to be a significant role for an "altruistic" model of bequest behaviour. When parental investments in children's human capital are incorporated, this model predicts that bequests should be very low for the majority but of rapidly increasing importance for high-income earners, corresponding with observation. While competing models sometimes predict that bequests may be taxed without incentive effects, the altruistic model (as well as the "strategic" model) denies this. Since bequests play a consumption-smoothing role over the generations, the discouragement to intergenerational saving created by taxing bequests can theoretically increase steady-state inequality. Even in altruistic models, however, the initial impact is to reduce inequality for several generations. Finally, taxing bequests should also lead to a substitution towards more investment in children's human capital, especially in the upper-income groups. If there is otherwise a tendency towards underinvestment in human capital, this could provide further motivation for the version of consumption tax reform under which bequests are taxed or for including inheritances in the base of an income tax.

9 Conclusion

The purpose of this study has been to evaluate the main options for capital income tax reform in Canada. In common with recent literature in Canada and other countries, we have identified the major alternatives as consumption tax and uniform income tax reforms. These major alternatives, as well as variations on each, have been evaluated with respect to the standard criteria of efficiency, horizontal and vertical equity, and simplicity. The broad conclusion is that CT reform appears almost certainly superior on the counts of efficiency and simplicity. Whether CT or UIT is horizontally more equitable is a normative question on which opinions may differ. Finally, it is very difficult to say which of the approaches would lead to a more equal distribution of income. Thus the choice on vertical equity grounds is not clear-cut.

Major Reform Options

The Carter Commission, and many other authors, have emphasized the horizontal *equity* aspects of the "dollar is a dollar" philosophy underlying the Haig-Simons definition of income associated with the UIT approach. In contrast, recent literature has increasingly focused on the possible *efficiency* gains from a CT approach to tax reform. The central difference is that under UIT real capital income is taxed annually on an accrual basis, while under CT capital income is taxed only insofar as it is consumed.

While the UIT option is familiar, as an ideal long espoused for personal taxation, the CT system is less so. Indeed, a practical plan for its implementation in a progressive form has only been worked out within the last 10 years, principally in the U.S. Treasury's *Blueprints for Basic Tax Reform* of 1977. The Blueprints scheme, as we have called it throughout this study, is surprisingly similar in certain features to the system of personal income tax already in force in Canada. It would allow a taxpayer to choose whether to "prepay" tax on a component of income to be saved in the year that income is received, or to take a deduction from taxable "income" in the year of saving, and pay only when the savings are consumed. The former treatment may be referred to as "nonregistered" and the latter, as "registered." Registered treatment corresponds very closely to that accorded pensions and retirement savings in Canada under our RPPs and RRSPs.

Registered and nonregistered treatment under the Blueprints proposal impose equal present-value tax burdens, assuming a stable tax system and either a constant marginal tax rate or optimal tax planning by the taxpayer. The fully informed, rational tax-planning individual, by judicious use of registered and nonregistered treatment, is able to "self-average" and obtain a constant marginal tax rate over the lifetime. The result is a progressive tax burden on lifetime, rather than annual, consumption.

Under both UIT and CT approaches there is an important question concerning the treatment of inheritances and bequests. Under the Haig-Simons approach, inheritances are clearly part of income. The Haig-Simons definition counts anything which would increase the taxpayer's net worth, given zero consumption, as income. However, there is dissent over the treatment of bequests. Since an amount bequeathed reduces the possible increase in net worth over a period, it might not be allowed as a deduction. On the other hand, it could be argued that bequests are *not* available to increase wealth and should be deducted. These alternative concepts of what is required for *horizontal* equity clearly have important implications for the distributive impact of taxes, that is, for vertical equity.

A similar situation holds in the treatment of intergenerational transfers under CT reform. Consumption of inherited wealth would be taxed – either via prepayment by previous generations (the case with nonregistered assets) or when funds were withdrawn from inherited registered accounts. Parallel to the Haig-Simons approach to annual income, the ideal treatment of bequests (and gifts) made to the succeeding generation (and others) is a matter of opinion. Either these donations may be viewed as consumption by the donor and included in the CT base, or they may be ignored.[1] Which treatment is more equitable, horizontally, is a normative question on which opinions may differ.

In Chapter 3, we argued that the essential dispute between UIT and CT advocates may *not* be over the ideal tax base but merely over how best it can be approximated in reality. Over a *lifetime*, if bequests are not regarded as reducing "income," Haig-Simons income is simply the discounted sum of earnings, transfer payments, inheritances, and other receipts. (This is the amount that could be added to net worth if consumption were zero over the lifetime.) But these add up to the discounted value of consumption, direct taxes, and bequests. Hence, in the lifetime framework, if we tax consumption plus bequests, we are also taxing *lifetime* Haig-Simons income.

The real point of divergence between UIT and CT advocates may be over whether a sufficiently close approximation to lifetime consumption taxation is feasible. The Blueprints scheme provides a progressive lifetime consumption tax in a world of certainty, as long as taxpayers are fully informed and minimize lifetime tax burden via appropriate use of registered and nonregistered assets. Even if the world is certain, if some taxpayers fall short of optimal tax planning, they will pay too much tax over their lifetimes. This raises obvious difficulties of horizontal equity and, perhaps also, vertical equity if higher-income taxpayers are better planners.

The element of risk in economic activity may also force a divergence between the Blueprints scheme and progressive lifetime consumption taxation. Suppose the end result of investing in nonregistered form in a risky venture, for example, turns out to be a large capital gain. In this case, the lifetime tax burden could be incommensurate with lifetime consumption. This problem can be addressed by taxing business income (both incorporated and unincorporated) on a cash-flow basis, which ensures the taxation of economic rents. However, with risky economic activity it is likely not possible to ensure complete *ex post* horizontal equity via the Blueprints scheme.

Efficiency

In the mid-1970s there was a great deal of discussion in the literature on the possible efficiency advantage of CT relative to UIT. This culminated in the work of Summers (1981), which has been extensively reviewed in this study (see Chapter 4). The argument is based on the fact that, unlike UIT, CT does not inflict double-taxation of savings – it does not distort on the intertemporal margin. Recently, this advantage has been questioned. It has been pointed out, for example, by Auerbach, Kotlikoff, and Skinner (1983) that, since the CT base is smaller than the UIT base, CT rates must be higher, at least in the short run, to collect the same revenue. But leisure is not taxed under either scheme, and the higher CT rates mean that labour/leisure choice would be distorted more under CT. This reduces the welfare gain from CT reform, although in several studies CT still is significantly superior to UIT with endogenous labour/leisure choice.

An important point that has been made several times in this study, and especially in Chapter 5, is that the efficiency consequences of alternative tax bases in a small open economy, typified by Canada, are very different from those encountered in a closed economy. Most of the studies on the welfare consequences of CT and UIT reforms have been conducted in the closed-economy framework. This necessitates a careful examination of how the open economy affects the comparisons.

In a closed economy, aggregate investment equals domestic saving. A standard equivalence theorem of public finance, which states that it makes no difference for tax incidence or true economic effects whether taxes are levied on sellers or buyers in such a closed market, implies that taxes levied at the corporate or personal level in such an economy are equivalent. Either type of taxation places a wedge between the "marginal efficiency" of capital and its opportunity cost, which in the closed-economy case is given by savers' marginal rate of time preference (the rate at which they are willing to give up present goods in return for future goods). Thus efficiency in production *and* intertemporal efficiency both depend on the absence of any capital income taxes. Under the UIT approach there must be both production and intertemporal inefficiency, while under the CT approach there will be neither.[2]

The situation in an open economy is very different. If the economy is "small" – that is, we are price takers in all world markets – it is theoretically possible to have production efficiency in the utilization of capital under *either* the UIT or CT approach, although it is still only possible to achieve overall intertemporal efficiency under CT. The reason is that aggregate investment is no longer constrained to equal domestic saving. This breaks the equivalence of capital income taxes levied on the users (e.g., corporations) and suppliers (e.g., households) of capital.

In a small open economy the opportunity cost of capital is the return that could be earned after business and corporate taxes on investments abroad. Production efficiency in the utilization of capital can be ensured by removing all wedges between the marginal efficiency of capital and this opportunity cost. Under the stated assumptions, all withholding taxes on capital income and the corporate income tax in its present form should be abolished.[3] Retention of CIT in its cash-flow form, however, is appropriate since in this form it is a tax on pure rent and not a tax on capital income.

Recognizing the openness of our economy may, therefore, fundamentally alter our attitude towards capital income taxes levied on the users of capital.[4] There is also, of course, much room for disagreement over the appropriate treatment of capital income at the personal level.

Under the UIT approach, capital income would be taxed fully at the personal level, creating an intertemporal distortion. Savers would not earn a net rate of return equal to what the world capital market is capable of providing. As usual, such distortion would be avoided under CT.

This analysis of international considerations is quite different from the one which has often been put forward, for example, by the U.S. Treasury (1984). The latter point of view is that, since most of the world is on an "income tax regime," full scale CT reform in a single country causes severe difficulties in international relations. Our analysis suggests this is incorrect, at least for Canada. Whether we head in the UIT or CT direction, we might well decide to impose relatively light corporate income tax and withholding taxes. Such a strategy does not create any international difficulty. Difficulties *would* arise under CT reform if, say, we effectively abolished CIT for Canadian residents by integrating it completely with a personal expenditure tax but tried to keep CIT in force for foreigners. Such discrimination would be in gross violation of our international tax treaties. But this kind of discrimination is *not* a necessary or desirable feature of CT reform in Canada, in our view. The cash-flow CIT, which we suggest goes along well with CT reform, would not be integrated with personal taxation and would, therefore, not discriminate against foreigners.

Horizontal Equity

Some of the major considerations relating to the horizontal equity of CT and UIT reforms have already been covered above. In the framework of lifetime tax incidence, it is possible to argue that CT reform is superior, since it allows the achievement, in principle, of a lifetime income or consumption tax base. Thus one avoids the capricious situation where individuals with temporarily high incomes, due to transitory good fortune, are taxed at the very high marginal rates that might be appropriate only for taxpayers with permanently high incomes. Also, one avoids discriminating against taxpayers with a more uneven age profile of basic receipts.

On the other hand, the UIT advocate might respond that the Blueprints scheme is an ingenious method of achieving progressive lifetime CT in an unrealistic world – one of certainty, with fully informed, efficient tax-planning individuals. He/she would likely feel that the cause of horizontal equity is actually better served by relating current tax burdens to current income, with some provision for short-term averaging.

A further important horizontal equity issue arises in the context of the transition to a new steady state under either CT or UIT reform. This is the intercohort redistribution which may occur. In a move to CT, for example, older cohorts would suffer a sizable unanticipated increase in tax burdens if all assets were suddenly declared to be registered. The opposite effect would be felt in a pure move to UIT without transitional arrangements: older individuals would benefit since they would not pay tax on the cash-out of amounts previously accumulated in registered form. Such redistributive effects have been modeled by several authors and are typically large. They pose a problem of horizontal equity, since they imply that taxpayers who differed only in date of birth might suffer increased inequality in lifetime tax burdens as a result of tax reform.

While redistribution between cohorts is unavoidable under either reform, the extreme intergenerational redistributions associated with wild swings in what assets are considered to be "registered" are not a necessary feature of the tax reform options. They can be offset by appropriate transitional arrangements. These arrangements are conceptually simple, and the administrative and compliance costs associated with them appear to us light.

Intergenerational inequities are avoided in the consumption tax reform we have explored in this study, to a very large extent, by allowing previously nonregistered assets to continue as nonregistered or to be deposited in registered accounts, earning a deduction in the usual way. This approach could conceivably lead to a short-term revenue deficiency since there would be nothing to stop the widespread reduction of tax liability by the deposit of existing assets in registered accounts. Fears along these lines should not be exaggerated since the extent to which taxpayers can reduce the present value of their eventual tax payments by this means is limited. However, such a problem can be avoided without difficulty by increasing the contribution limits to registered savings plans gradually – as the federal government has in fact announced it will do in Canada over the next several years.

Transitional arrangements for registered accounts to maintain horizontal equity between cohorts under UIT reform might require all registered plans to be immediately cashed out (perhaps with the purchase of income averaging annuities), with the amounts cashed out included in taxable income. This would terminate the old tax regime and "settle its books." Subsequently, all income would be treated on a UIT basis. Grandfathering of existing registered accounts, it should be noted, would be inconsistent with the UIT approach, since the tax-free accrual of income within the plans violates the UIT concept of equity.

Vertical Equity

Analysis of the vertical equity implications of the tax reform options has been one of the most difficult tasks attempted in this study. Assessment of these implications requires an investigation of the impact of possible tax changes on the size distribution of income. To complicate matters, effects on (after-tax) income inequality may differ between the short and long run, and the effects may look very different depending on whether we examine the *annual* or *lifetime* distribution of income.

In Chapter 7 we looked at the short-run impacts of CT and UIT reforms, as well as at some of the long-run effects, mostly without taking intergenerational transfers into account. As is generally understood, both saving and capital income rise as a fraction of income – and do so especially steeply at the highest-income levels. Hence, starting from the current situation, with the present PIT rate structure, a move to UIT would increase progressivity, while CT reform would do the opposite. But if the PIT rate structure and the base were both altered, this is not necessarily so. The best example is the "flat tax" proposal to implement proportional UIT (or at least, a constant marginal UIT rate). As we have seen, this would very likely reduce progressivity in Canada. On the other hand, although the reduced progressivity under CT reform could be offset somewhat by changes in the PIT rate structure, it is unclear that progressivity could be held constant without prohibitively high marginal tax rates in the upper brackets.

A further contribution of Chapter 7 was to show that if distributional effects are assessed on a *lifetime* basis, the difference between UIT and CT is much smaller than in annual data. This is especially true if bequests are taxed under CT.

Further distributional effects are associated with the capital gains and losses that would accompany any capital income tax reform. Windfall gains and losses would occur under either UIT or CT reform, due to the move to *uniform* treatment of capital income. Such gains and losses would not necessarily be confined to physical assets. Under CT reform, for example, personal after-tax marginal rates of return would increase significantly, especially for high-income taxpayers. This increase would lead to heavier discounting in the calculation of human wealth, which would reduce significantly the relative human wealth of those receiving earnings later in life – that is, the more educated.

Finally, in the long run there is an important mechanism tending to generate greater income equality under CT than under UIT. In a closed economy CT would likely lead to greater capital accumulation, resulting in a rise in real wage rates, which would be broadly equalizing given the greater importance of labour income for those below the upper tail. (Some decrease in the relative share for the lowest-income groups would be observed, however.) As discussed earlier, in an open economy the same increase in capital accumulation could, in principle, be secured under either CT or UIT by reducing taxes on the *users* of capital (for example, corporations). However, as pointed out above, in practice a corporate income tax must be levied under UIT as a withholding tax on corporate level income. In our opinion, such a tax is likely to reduce the attractiveness of investment in Canada to foreigners and to reduce the capital stock in the long run.

Simplicity

It has been argued by consumption tax advocates that CT reform clearly dominates UIT on the simplicity count. Under UIT reform, in principle, it becomes necessary to tax all capital income on a real accrual basis. This introduces such complexities as adjusting the measurement of all capital income for inflation, ensuring that capital gains and retained earnings are taxed as they accrue, rather than on realization, and taxing imputed rents. In practice, these problems are prohibitively severe. Inflation adjustments of the type proposed by the U.S. Treasury (1984) might conceivably be enacted, but are rough-and-ready rather than exact. The taxation of capital gains on an accrual basis and the taxation of imputed rent from homeownership entail severe implementation, as well as political, difficulties.

In contrast to UIT, CT reform requires much less difficult changes in our tax structure. At the PIT level we move towards CT reform every time we increase the contribution limits for RPPs and RRSPs. (The large increases in these limits initially projected in the February 1984 budget, and confirmed in the May 1985 budget, are clearly in this category.) What is required to achieve full CT reform is to remove RRP and RRSP contribution limits entirely and to free the return to nonregistered assets from tax. Housing is already treated as a nonregistered asset, so that no issue of measuring imputed rents arises. Similarly, the difficulties involved in the computation of real capital income and the taxation of accruing capital gains do not arise.

Finally, one of the most important appeals of CT reform is that a relatively painless strategy exists for its gradual introduction. This is important in the transition phase. As mentioned above, gradual increases in the contribution limits to registered assets move us slowly towards full CT reform. The same could be said for a gradual increase in the capital income exemption (currently $1,000) necessary to expand the role of nonregistered assets.

Final Comments

The conclusion of this study is thus that, on the grounds of efficiency and simplicity, gradual movement towards consumption tax reform along the lines of the Blueprints scheme in Canada is likely more desirable than an attempt to implement uniform income taxation along the lines recommended by the Carter Commission and others. We would also argue that, on the grounds of horizontal equity, CT reform would be preferable in a world of certainty and fully informed, efficiently planning taxpayers. Given the riskiness of economic activity, the CT ideal of progressive taxation on *ex post* lifetime consumption or lifetime income may not be achievable. The question then arises of whether it could be horizontally more equitable to tax principally on the basis of comprehensive annual income. We would be inclined to answer in the negative, as long as business taxation is on a cash-flow basis to ensure the taxation of economic rents. Finally, if tax burdens are assessed on a lifetime basis, we believe there is no firm reason to expect a loss of vertical equity in CT reform, especially since the scheme taxes the consumption of inherited wealth and need not be implemented with a deduction for bequests.

Notes

CHAPTER 1

1 The degree of progressivity must be judged by reference to the relevant ability-to-pay index. For example, if the latter were consumer expenditure, then the system would be progressive or regressive depending on whether tax payments as a fraction of expenditure rose or fell with expenditure, respectively.

2 An externality exists when the consumption of some good directly affects (positively or negatively) the utility of someone other than the consumer. Externalities of production activities, for example, pollution, are also possible. Externalities, in principle, can prevent the achievement of efficiency in competitive equilibrium since agents ignore the benefit or harm their production or consumption activities are having on others. By conducting their activities up to the point where private benefits and costs are equal at the margin, which would be efficient in the absence of externalities, they guarantee that marginal social benefits and costs will *not* correspond. (For example, in the pollution case, social costs exceed private costs, so that the marginal social cost exceeds marginal benefits when private costs equal private benefits at the margin.) There is considerable disagreement over the quantitative importance of externalities in practice.

3 If a society as a whole faced a known terminal date, the straightforward application to dynamic efficiency would go through. However, a terminal date is not a natural assumption. As Malinvaud (1953) and Samuelson (1958) showed, if society as a whole faces an infinite horizon, but there are no infinitely lived agents, competitive markets do not guarantee efficiency. Efficiency in competitive equilibrium can be rescued (without government) if there are organizations (e.g., corporations) that can exist indefinitely and act like infinitely lived agents, or if successive generations are linked up by altruistically motivated bequests. Alternatively, Samuelson shows how government can facilitate the achievement of dynamic efficiency by making saving possible (either privately or via social security) in an overlapping generations situation even in the absence of durable capital. For further discussion, see Boadway and Bruce (1984, pp. 88-90 and 316-17).

4 In principle, there could be imperfections in a no-government economy, whose correction by taxation, leading to a closer satisfaction of the efficiency conditions, would be possible. (An example is provided by the dynamic inefficiency of a no-government economy discussed above.) In practice, it is often difficult to identify such imperfections and to have much confidence that government action will really correct them.

5 There is controversy over whether corporate tax more closely approximates a tax on capital income, or a tax on pure economic profit (especially at the margin). (See the discussion in Chapter 4.) If the tax is close to the latter, it may create little distortion.

6 Note that equal proportional taxes on goods and services only imply overall efficiency if *all* goods and services are taxed. In general, one of the most important goods, that is, leisure, is never taxed. (See the discussion below.) Thus it is in general *not* desirable from an efficiency viewpoint to tax those goods and services that are subject to sales taxes, value-added tax, etc., at a uniform rate. The optimal tax literature provides rules prescribing the optimal structure of taxes on different goods and services in this second-best situation. See, for example, Atkinson and Stiglitz (1980, lecture 12).

7 Fisher (1937) believed that income should be defined in the same way as consumption! Although the Haig-Simons definition prevails today, there is still some discomfort, as expressed, e.g., by Kaldor (1955) and the Meade Committee (Institute for Fiscal Studies, 1978), over the use of this definition, without modification, as the basis for income taxation. These concerns are discussed in Chapter 3.

8 Expenditure taxes were used in both India and Sri Lanka over various periods in the 1950s, 1960s, and 1970s, in response to reports on tax reform drafted for these countries by Kaldor. In both cases the taxes were meant to supplement existing income taxes. In practice the taxes suffered from numerous special exemptions and exclusions, became quite unpopular, and were finally abandoned. The relevance of this experience for personal expenditure taxes in developed nations is unclear, and has not been carefully assessed, to our knowledge. See Goode (1980, pp. 69-71).

9 Strictly, free choice is consistent with the attainment of an *ex post* lifetime consumption tax base only if there are no uncertain rates of return. See the discussion in Chapter 3.

CHAPTER 2

1 This is due to a conceptual problem, not lack of data. An example will make the point. In 1983 a single taxpayer with $20,000 in earnings and $10,000 of (taxable) capital income (and only standard exemptions and deductions) would have paid $7,425 in total federal and provincial PIT in Ontario, and his marginal tax rate would have been 37 per cent. (The average tax rate is $7,425/$30,000 = 25 per cent.) If the $10,000 of capital income is considered the "first" $10,000 of income, it gave rise to only $1,028 of tax and was therefore taxed at only 10 per cent. If it is considered

the "last" $10,000, however, it increased tax liability by 90 per cent and was taxed at a rate of 35 per cent. Prorating PIT to the two income sources, on the other hand, the capital income would appear to be taxed at the average tax rate of 25 per cent. It is not clear which of these alternatives is most appropriate. It may not be meaningful to ask how much of PIT represents a tax on capital income.

2 Interest, dividends, capital gains, income from trusts and annuities, "other" Canadian investment income, foreign investment income, and net rental income added up to $30.7 billion, or 13.1 per cent of total income assessed, $234 billion. Note that this capital income is partly sheltered by the $1,000 investment income deduction and dividend tax credit, discussed below.

3 Gordon (1985*a*) argues that, in fact, the Canadian PIT may provide *more* favourable treatment to saving, on balance, than would a consumption tax.

4 In the 1975 tax year, interest and Canadian dividends totalled $6.189 billion, while the deduction had an aggregate value of $2.243 billion. In 1981 the corresponding figures were $25.699 and $4.909 billion, respectively. The 1981 aggregate for capital gains on Canadian securities was $2.370 billion, so that the fraction of total eligible "income" excluded as a result of the deduction was just 17.5 per cent.

5 The deduction was worth $934.7 million, while eligible pension income (excluding old age pensions and CPP/QPP benefits) totalled $4,425.8 million.

6 This is not an exhaustive listing of exclusions. In addition, for example, contributions to registered educational leave savings plans (RELSPs), unlike RRSPs, are not deductible, but income accumulates in these plans tax-free and withdrawals are lightly taxed (since the beneficiaries – students – generally have low incomes). This is roughly equivalent to a full exclusion of investment income generated by an RELSP.

7 For example, Brown (1982, p. 111) points out that a taxpayer in a 30 per cent marginal rate bracket throughout life could generate net annual after-tax retirement income for 15 years of $3,150 on the basis of an investment of $1,000 of before-tax income each year for 20 years and a constant interest rate of 7 per cent, whereas an annual net retirement income of only $2,190 would be secured if the saving occurred in nonsheltered form.

8 The 1985 budget, however, discontinued another less important tax sheltered savings plan, the registered home ownership savings plan, discussed below.

9 Money purchase plans are like an RRSP: the contributor has a claim on part of the pension fund and the eventual pension depends on the accumulation of those assets. In contrast, the defined benefit plans require contributions and guarantee a specified level of benefits, according to salary and years of service. Benefits may, for example, be a certain percentage of the average salary over, say, the 10 highest earning years with the company. Defined benefit plans have traditionally provided more scope for sheltered saving than money purchase plans. The procedures outlined in the 1984 and 1985 budgets attempt to overcome this differential treatment.

10 To some extent the return to human capital investment is earned in household production rather than in the market. This results in treatment similar to that of the former RHOSP: a deduction is earned for the costs of investment, but part of the eventual cash-out is tax-free. Another way of looking at this is that the original investment in human capital in this case represents untaxed household production, that is the treatment is the same as for other untaxed forms of "income in kind."

11 Prior to the February 1986 federal budget, the dividend received was "grossed up" by 50 per cent, and the grossed-up amount was included in income. A tax credit equal to 50 per cent of the dividend was allowed. Thus if the grossed-up dividend is thought of as an estimate of the corporate income that produced the dividend, the tax credit was 33-1/3 per cent of the income that hypothetically gave rise to the dividend. The February 1986 budget proposed that the gross-up should be reduced to one-third, effective January 1, 1987. The credit will thereafter equal only one-quarter of the grossed-up dividend.

12 For example, if a stock initially costing $1 were held for 10 years, over which it had a constant nominal rate of appreciation of 15 per cent, and the taxpayer had a 50 per cent marginal tax rate, at the end of 10 years he would have a realized capital gain of $3.05 and would pay tax of $0.76. The implied annual after-tax rate of return would be 12.6 per cent. If inflation was running at 10 per cent (typical in the late 1970s) the real rate of return via capital gains would have been reduced by about 50 per cent – that is, by about the marginal tax rate.

13 This provides a standard justification for the corporate income tax. Its objective may be seen as to eliminate the tax deferral advantage, in a rough-and-ready way.

14 The unpopularity of a tax vehicle for capital gains offering only restricted possibilities for tax deferral, like the ISIP, in a period of moderate and declining inflation, like that observed over the period when ISIPs were allowed, is not surprising. What is unclear is whether such a vehicle would have been attractive to large numbers of investors during the years of higher inflation in the 1970s and early 1980s.

15 See, for example, "Tax season spawns intriguing shelters," *The Globe and Mail*, December 2, 1985, p. B1, which outlines a complicated shelter whose tax-saving value depended on continued depreciation of the Brazilian currency.

16 On October 10, 1984 the new Minister of Finance, Michael Wilson, had already placed a moratorium on the notorious SRTC "quick flip." Under the latter, a $1 contribution to an R&D firm could earn, for example, a 50-cent tax credit plus a cash payment, say 55 cents, from the firm. Transactions in which the investor received, instead, common stock rather than cash in return for the $1 contribution remained possible under the May 1985 budget.

17 Note that with the $500,000 lifetime capital gains exemption announced in the May 1985 budget, the shareholder's disadvantage (if any) decreases further.

18 The fact that CIT does not tax the return to debt capital is ignored in many studies in public finance, which treat CIT as a tax on the use of capital. This approach is most closely associated with the work of Harberger (1968). At the opposite extreme, it has been argued by some (see, for example, Stiglitz, 1976) that debt is often the marginal source of finance, so that at the margin CIT approximates a tax on rent.

19 Note that if our benchmark CIT falls on shareholders' Haig-Simons income at the corporate level, deductions for the cost of equity capital are unnecessary, and the absence of such deductions is not identified as a difficulty in CIT design. Clearly, serious difficulties would be involved in formulating a deduction for the cost of equity capital, particularly if one envisages a deduction for the shareholders' cost of risk-bearing.

20 The credit for processing extends to a wide variety of industries, including, for example, farming, fishing, logging, grain storage, and processing of industrial minerals.

21 This is true as long as the carrying cost of an investment is deductible. (Note that this condition is not satisfied for equity-financed investment, but it is satisfied for bond-financed investment since interest is deductible.) As discussed in the next chapter, CIT could be put on a cash-flow basis under which no deduction is allowed for carrying costs, but there is a 100 per cent immediate write-off. The cash-flow approach is equivalent to providing true economic depreciation and a full allowance for carrying costs.

22 While the efficiency implications of the type of CIT reform projected in the February 1986 budget are desirable, it is important to note that there are distributional consequences as well. Reduction in both investment tax credits and tax rates will redistribute the CIT burden towards more capital intensive and more rapidly expanding firms and industries. A similar proposal launched in the U.S. Treasury report (1984) encountered severe opposition from the so-called "smokestack" industries, which had been involved in a heavy program of updating capital equipment and which had benefited greatly from accelerated depreciation and investment tax credits in the early 1980s.

23 This is in contrast to the practice under the U.S. CIT where the firm has a choice between FIFO and LIFO (last-in, first-out).

24 The federal Department of Finance (1985) estimated that taxes as a fraction of financial statement income averaged 13.2 per cent in mining and 21.8 per cent in oil and gas as of 1981 (p. 34). The overall average rate was estimated at 17.9 per cent. Marginal tax rates on new investment were estimated at 8.5 per cent for large corporations in the resource sector vs. an overall figure of 28.0 per cent for all corporations (p. 37).

25 It has been argued that special treatment is required for the resource sector, for example, because the cost of risk bearing is higher than in other sectors, or because there are capital market imperfections leading to cash-flow constraints on investment in the resource sector, or in order to provide incentives similar to those available in the United States. See, for example, Boadway and Kitchen (1984, pp. 196-201), who give these arguments short shrift. They point out that there may be a legitimate argument for special treatment of exploration expenses since there is an externalities problem. (The information gained in exploration tends to leak out to other firms.) Unfortunately, a full discussion of these issues is beyond the scope of the present volume. See also Heaps and Helliwell (1985) and Cairns (1985).

26 Heaps and Helliwell (1985, p. 462) point out that "there are numerous abatements and special provisions for new discoveries, low productivity wells, and oil obtained at higher cost by the use of enhanced recovery techniques. These royalty reductions for higher-cost sources also have the effect of making the gross royalty more like a profits tax." That is, levying lower *ad valorem* royalties on higher-cost sources of oil has somewhat the same effect as allowing costs to be partly or wholly deducted.

27 The efficiency characteristics of the widely varying forms of provincial royalties and resource taxes are clearly very interesting. The use of royalties rather than net income taxes in the petroleum industries would be predicted to slow the exhaustion of reserves. Considering the relatively small reserves of conventional oil remaining in Canada, there could be an efficiency rationale in terms of the social benefits of slower extraction that would not be taken into account in private decision making.

The use of licences in mining is theoretically a good way to exact resource rents without affecting the pattern or timing of resource extraction. However, insofar as the net income taxes reduce the rate of return to capital investment, they would be expected to slow the rate of exhaustion (by making marginal mines unprofitable, etc.). This may perhaps help to explain the accompanying use of acreage taxes in several provinces. These *in situ* taxes, as mentioned in the text below, speed up resource extraction, since the faster resources are extracted the more rapidly the value of remaining reserves, on which acreage taxes are partly based, declines.

28 These figures come from unpublished calculations using the 1982 family expenditure survey micro data tape.

29 Note that this statement is not merely equivalent to the often-noted apparent regressivity of property taxes in annual data. A mild decline in property tax, as a fraction of net imputed rental income, as income rises is consistent with a progressive impact of the owner-occupiers' portion of property tax. All that is required is a fairly strong relationship between income and home ownership. In fact, the incidence of home ownership rises from 33 per cent in the bottom decile of the family expenditure survey data to 89 per cent in the top decile, so that property tax on *owner-occupiers* would appear progressive in these data using the usual annual incidence framework. (See Chapter 7 for a discussion of incidence studies.)

CHAPTER 3

1 Vickrey (1947) certainly believed that his "lifetime cumulative averaging scheme" was practicable. Many have taken a pessimistic view of his proposal, however.

2 This constraint only sums up lifetime consumption opportunities, strictly and uniquely, if E_t, I_t, and G_t are all exogenous. In fact, E_t and G_t at the least must be recognized as endogenous. This means that lifetime opportunities are also affected by the human capital production function (which tells us how present earnings may be traded off for future earnings in the processes of going to school or training on the job) and the formulas to pay out G_t.

3 This reflects a judgment that opportunities for consuming leisure do not affect the ability to pay. If leisure is to be incorporated, an augmented lifetime budget constraint in which the value of leisure time is added on both sides of the constraint would be required. We do not consider such an approach in the text since proposals to tax leisure do not appear to be in the "feasible set."

4 In parallel fashion to the use of the term "consumption tax" to refer to a tax on consumption plus bequests, the term "wage tax" may be used to refer to a tax on earnings, inheritances, and government transfers. To avoid confusion, if we wish to denote a tax on earnings alone we will refer to it as a "strict wage tax."

5 Some observers have suggested that the lack of intertemporal distortion should actually be taken as the defining characteristic of a consumption tax. See, for example, Bradford (1985, p. 1).

6 Since inheritances are typically "lumpy," there will be many years in which $I_t \approx 0$ for the typical individual, and perhaps a few in which I_t is very large. This exacerbates "averaging" problems if Y_t is the tax base and the tax scheme is progressive. Under proportional taxes, considered here, there is no problem.

7 For an argument along these lines see Klein (1977), and for a rebuttal, Goode (1980, p. 60). See also Boskin (1975).

8 In the sense that if discounted lifetime tax burdens, T, are compared with lifetime wealth, L, it will be found that all those with equal L pay the same T, and T/L rises with L.

9 We can check to see that this formula is correct for the above example. There $\tau_1 = 0$, $\tau_2 = 0.5$, and $r = 1$, so that $\partial C_2/\partial C_1 = -1.33$. That is, $1 less of consumption in the first period makes possible only $1.33 of additional consumption in the second period, as found above.

10 The slope of an indifference curve at the 45° line in the intertemporal context is usually thought of as $-(1+\rho)$, where ρ is the rate of time preference. Thus the nondistortionary case is that where $r = \rho$.

11 Hood (1982) pioneered the diagrammatic analysis presented in Figures 3-1 and 3-2.

12 Ideal registered treatment would require the removal of RRSP and RPP contribution limits, as well as the removal of the requirement that the accounts should be annuitized in some fashion on retirement.

13 Nothing essential in the analysis is altered if there are second-period earnings, E_2. The endowment point D would simply be above the horizontal axis. A concave registered asset budget constraint just like that illustrated in Figure 3-2 would again be obtained, passing through the new point D.

14 The taxpayer may be thought of as starting from point A and being allowed to save as much as desired in registered form before any taxes are extracted. The optimizing taxpayer would save enough to move to point F on the no-tax budget constraint, so that taxable "income" in each period would be equal to OI. A tax of HI would be payable in each period, so that the after-tax endowment point of E is reached. Now, starting from any point on AFB the taxpayer's strategy of moving first to F would be the same. Thus *any* taxpayer with lifetime earnings equal to E_1, irrespective of the time path of annual earnings, has the same after-tax endowment point.

15 Note that if $E_2 > E_1$, to get to point E borrowing in *registered* form would be necessary. Hence negative balances in registered accounts might be desired, for example, by the young.

16 If an heir consumes any element of the registered assets he receives, he will of course be taxed. Tax on any consumption of nonregistered assets should be regarded as having been "prepaid" by earlier generations.

17 This is one reason why, in the next section, we reject the suggestion of Boadway and Mintz (forthcoming) that shareholding be restricted to the registered form of treatment.

18 As pointed out in the previous chapter, human capital investments differ from other registered assets by producing a nonconstant rate of return. In Chapter 6 we demonstrate that the current tax treatment of human capital is appropriate from the consumption tax viewpoint. As long as borrowing in registered form is possible, people will undertake efficient investment in human capital, and if the rest of the tax system is based on the registered-nonregistered scheme, the effective tax base will indeed be lifetime wealth.

19 Note that shareholding, for example, receives only partially nonregistered treatment as a result of these arrangements. One's capital gains might be exempt under the $500,000 lifetime capital gains exemption, while dividends on the same shares might be taxable due to exhaustion of the $1,000 deduction.

20 Cash-flow taxation of unincorporated business would mean that all business outlays except interest payments would be immediately deductible, and the full revenue of the business would be taxable. Any excess of revenue over outlays would represent a withdrawal from the business, formally the same as a withdrawal from a registered account.

21 In principle, it would be desirable to levy a progressive tax on consumption of nondurables and the *services* of durables, rather than on consumer expenditure. However, such an approach is unfeasible due to

the difficulty of measuring the service flow from durables.

22 Note that these difficulties did not deter Kaldor (1955) from advocating a progressive annual tax on consumer expenditure as a supplement to the income tax in the United Kingdom for high-income taxpayers. The Meade committee took a similar position, recommending that most assets be required to be registered, and leaning in the direction of treating housing as registered. (See Institute for Fiscal Studies, 1978, pp. 175-83 and Chapter 11.)

23 In principle, registered treatment of housing could be allowed. The Meade committee went so far as to entertain the possibility of such treatment being "required." In practice, the arrangements that have to be made to achieve registered treatment for housing would likely appear very complex to the representative taxpayer (although the principles underlying this treatment are simple in the eyes of tax reformers). At least in the initial stages of consumption tax reform we believe it would contribute considerably to public acceptance simply to continue with our current tax-prepaid nonregistered treatment.

Registered treatment of housing would work as follows. The amount paid to purchase a house would of course be deductible. Part of this deduction would typically be offset, however, by withdrawals from other registered accounts in order to make a down payment. In order to achieve optimal self-averaging the taxpayer would likely opt for the mortgage debt to be held in registered form. Since the amount borrowed via the mortgage would be taxable, the deduction earned by the purchase of the house would be further offset. Payments of interest and principal over the period of home-ownership would be deductible since the reduction of a registered debt is equivalent to saving in registered form. Also, an imputation for consumption of housing services – equivalent to a withdrawal from a registered account – would have to be made (perhaps applying a standard rate of return – 3 per cent was suggested by the Meade committee – to the initial purchase price). Finally, the entire proceeds of the home sale would be taxable (subject of course to the discharge of the remaining mortgage being deductible, and the possibility of rolling over home equity into other registered assets – e.g., a new house). See, for example, Institute for Fiscal Studies, 1978, pp. 221-22.

24 The proposal in the November 1981 budget to severely restrict the interest expense deduction met with concerted opposition from investors. Elimination of this exemption is evidently a reform that has to be handled very carefully. (That is, it should perhaps be conspicuously accompanied by the introduction of other elements of the lifetime consumption tax reform that favour investors.)

25 If a well-designed scheme of general averaging were in effect, this consideration would clearly be of reduced importance.

26 In principle, it would be desirable for taxpayers to be able to opt for tax-prepaid (nonregistered) treatment of unincorporated business income. However, it would be extremely difficult to offer such treatment in practice, since it would require distinguishing between the exempt capital income component and the taxable labour income portion of unincorporated business income.

27 That is, a strong case can be made for running the unemployment insurance system much more along true insurance lines, for replacing the CPP with an (mandatory) RPP-type scheme, etc.

28 Note that if CIT preferences were not reduced, imputation of retained earnings to taxpayers could in some cases cause serious liquidity problems. In the present case, a lower-income taxpayer might own part of a corporation with sizable profits, high retained earnings, and low taxes due to tax preferences. The increase in PIT liability due to including imputed retained earnings in personal income might easily exceed the tax credit for CIT paid by the firm, placing the taxpayer in some undeserved difficulty. Such problems reflect the unraveling of CIT preferences that would be caused by integration.

29 The fact that the capital gain is smaller than it would otherwise be due to the expected (personal) taxes that must be paid on the future rents does not affect this. The capital gain is income in the year it occurs, according to the Haig-Simons definition, and the future rents will be income as they occur in the future. The situation is analytically the same as if someone gave another person some stocks in the current tax year. As a gift, these should clearly be included in income when received, even though their value is reduced by the amount of expected future tax liability they produce for the representative investor.

Chapter 4

1 It is interesting to note that the income effect will be relatively more important for those with larger nonlabour income, *ceteris paribus*. This provides an *a priori* expectation that the work disincentive effects of an increase in income tax rates (which can be negative, as the above discussion points out) should be smaller for higher-income groups, where the relative importance of capital income is greater.

2 Interestingly, Killingsworth (1983, pp. 129, 185, and 192), in bringing Borjas and Heckman up to date, concludes that more recent work suggests higher elasticities (algebraically) for both men and women, so that the 0.15 figure may be conservative for the aggregate elasticity.

3 As drawn, the response to a fall in the wage rate is increased labour supply, indicating that the worker is on the backward-bending portion of his labour supply curve. This means that the diagram illustrates the situation of the typical male worker, rather than that of, for example, the typical married woman. (The uncompensated wage elasticity of labour supply for married women is generally found to be significantly positive.)

4 Note that it is possible, say, for WT to be dominated by UIT on efficiency grounds but for ET to be superior to UIT on this basis. This divergence is in fact found

in the study by Auerbach et al. (1983) discussed below.

5 In fact, although Harberger used his GE model to look at the incidence and allocation effects of CIT, he was unable to quantify excess burdens at this level of analysis. His famous conclusion that the welfare cost of CIT was approximately 0.5 per cent of GNP was derived from the partial equilibrium device of "Harberger triangles" for the corporate and noncorporate sectors, as discussed below.

6 The lower bound used the nondistortionary prices to evaluate GNP in the two equilibria, while the latter used the distortionary prices. Thus the lower and upper bounds employ Larpeyres and Paasche indexes, respectively. These bracket an ideal measure of welfare loss.

7 For an excellent summary of incentive effects in this case, see Atkinson and Stiglitz (1980).

8 In the special case where both population and earnings growth are absent, the factor of proportionality in question is zero. Thus aggregate saving is always zero in a steady state, and changes in S_1 cease to imply any change in aggregate steady-state saving.

9 See the discussion earlier in this subsection of the relationship between changes in S_1 and aggregate private saving.

10 Feldstein (1978, p. 45) suggests that a welfare loss equal to 33 per cent of first-period saving would correspond to "substantially more than 3 per cent of national income." Applying the same ratio to the welfare losses discussed here (20 or 25 per cent of first-period saving) would give aggregate losses "substantially" greater than 2 per cent of GNP.

11 The separate welfare losses cannot, of course, simply be added. A rigorous procedure would require the static and dynamic welfare losses to be combined in an explicit model. This is done, for example, by Fullerton et al. (1983) in their general equilibrium computations for the United States. See the discussion in the next section.

12 This was modeled in the working paper on which Summers (1981) was based, but not in the published version.

13 Nonzero technical progress is incompatible with the achievement of a steady state in the AKS model due to the endogeneity of labour supply. (Technical progress implies a wealth effect leading to ever-shrinking labour supply.) This raises important methodological questions about the approach.

14 All comparisons made here are with Summers' Cobb-Douglas production function case. AKS do not consider cases with an elasticity of substitution in production other than unity.

15 Although Summers' welfare gains are reported for $\sigma = 0.5$, this is not the case for capital/labour ratios.

16 As in Summers' model, the welfare gain is less under wage tax for two reasons: the capital/output ratio rises less and the present value of wage taxes is greater than that of expenditure taxes for a steady-state cohort, given equal annual government revenue requirements.

17 As pointed out in Chapter 3, and below, under the Blueprints-style CT approach windfall losses for the elderly are much less of a problem, since any assets they hold which were not formally registered prior to tax reform would be treated as nonregistered. The ET reforms considered by Summers and AKS would, in contrast, treat all assets as registered by fiat.

18 In confirmation of results of AKS, Daly et al. also find that the welfare gains of going from an income tax to a consumption tax are not substantially affected by modeling progressive rather than proportional taxes.

Chapter 5

1 A much more detailed discussion is provided by Brean (1984).

2 In fact, the way the tax credit mechanism operates in the United States is a little more complex than this. Creditable taxes from worldwide operations are taken together and compared with U.S. tax liability. If total credits were less than the latter liability, then full credit for Canadian CIT paid would be received even if the Canadian liability was less than the U.S. CIT that would be payable on Canadian source income. See Deutsch and Jenkins (1982).

3 Deutsch and Jenkins (1982) investigated empirically the change in U.S. tax payments that would be experienced by U.S. subsidiaries in Canada on earnings which were repatriated in 1972 and 1974 when Canadian withholding taxes and CIT were altered. The most important determinant of whether there is an offsetting change in U.S. tax is whether the U.S. parent has a "deficit" or "surplus" of credits against U.S. tax from its worldwide operations. Although oil companies, for example, in 1974 had surpluses (and, therefore, could not use increased Canadian credits to reduce U.S. tax), typically the parent firms appeared to be in a "deficit" position, so that they could use the increased credits arising when Canadian tax rates were increased to reduce their U.S. taxes.

Note that the Deutsch and Jenkins study investigated only changes in U.S. tax liability in respect of earnings being repatriated. Their work does not allow us to assess the importance of deferral.

4 An additional difficulty is explained by Brean (1984, p. 68). U.S. financial institutions often do not obtain full use of credits against U.S. tax on Canadian withholding tax. The Canadian tax is levied on gross interest. The change in the tax base of the U.S. financial institutions, however, is net foreign source income. Interest paid by the financial institution to its depositors and other lenders must be deducted in calculating this net income. Thus the relevant U.S. tax base is a small fraction of the gross interest flow. Hence, typically, the credit for Canadian withholding tax cannot be fully utilized.

5 In the purely domestic case, the portion of the return that is taxed away accrues to Canadians (perhaps via public consumption), creating an "external benefit" of investment that has to be taken into account in cal-

culations of the socially optimal amount of private saving.

6 The U.S. Treasury (1984, p. 204) expressed considerable concern over the ramifications for the United States of removing the foreign tax credit. The U.S. is a major capital exporter, and has long preached the virtues of "capital export neutrality," which is widely believed to be enhanced by the foreign tax credit. Withdrawal of the credit would result in considerable censure from host countries that would lose U.S. investment as a result. Parallel considerations are hardly applicable in Canada, especially since the active business income of Canadian corporations with subsidiaries abroad now enters Canada as "tax-exempt surplus" – that is, it does not currently receive a tax credit.

7 Otherwise, the after-tax rate of return on investment in Canada would not rise when Canadian capital income taxes were removed for "immature" U.S. subsidiaries. (The after-tax return would, however, rise for "mature" U.S subsidiaries. See the previous section.)

8 The net rate of return to Canadian savers of investing in international capital markets does not rise since we are assuming that all capital income taxes are on a "source" basis.

9 If the treasury transfer effect was fully operative, and all foreign subsidiaries were "immature," the after-tax marginal efficiency of investment schedule from the viewpoint of foreigners would remain at r_C in Figure 5-1. Then the abolition of consumption taxes in Canada would lead once again to the Figure 5-2 equilibrium with aggregate investment at I^2 and no foreign investment. In a case where foreign investors remained marginal, however, we would again get equal volumes of investment under the discriminatory approach of Figure 5-2 and a nondiscriminatory approach with a fully operative treasury transfer effect, but the nondiscriminatory approach would transfer revenues from the Canadian treasury to foreign treasuries and would, therefore, be inferior on efficiency grounds.

10 Light treatment for manufacturing under CIT and heavy indirect taxation of manufactured goods are consistent in this context. The light CIT treatment helps domestic manufacturers to compete with foreign manufacturers. On the other hand, since a large fraction of manufactured goods purchased by Canadians come from abroad, heavy sales taxes on these goods help to keep down imports and improve the terms of trade.

11 Thirsk (1985) suggests that the results of Murray (1982) indicate that the interest elasticity of supply of foreign capital to Canada is between 1 and 3. It would be interesting to know how Burgess's results would be affected by incorporating such a low elasticity.

12 A special problem arises in the case of immigrants. The assets they bring with them will, of course, be held in nonregistered form. A wealthy immigrant, then, could enter Canada, finance consumption over the remainder of his/her lifetime out of previous savings, and pay no income tax. This might well be considered unfair, given the substantial benefits from government expenditures and transfer payments (e.g., OAS and GIS) which may be received by the immigrant.

A possible response to the problem of immigrants' assets might be to regard prepayment of PIT in the country of origin as irrelevant in determining the appropriate tax burden in Canada over the portion of life remaining. Under this approach, assets brought in would be treated as "income" for PIT purposes in the year of entry. This would likely induce very large contributions to registered savings plans. Clearly, this approach would make immigration less attractive. It is difficult to tell how sizable the resulting changes in the level or composition of immigration would be. If these were expected to be sizable, it might be advantageous to take a less draconian approach.

The U.S. Treasury (1984, pp. 204-5) points out that several European countries have viewed immigration/emigration effects of the CT approach as a serious difficulty. This is a little hard for us to see as a major stumbling block, especially given the Canadian experience of handling deemed realization of registered savings plans on emigration.

The U.S Treasury also conjectured a variety of tax avoidance schemes based on international transactions in "qualified" assets. These merely point to the importance, in our view, of maintaining proper regulation of registered savings accounts. There is, of course, no difficulty with respect to nonregistered assets, which could be the primary vehicle in international transactions, in any case.

13 Boadway and Mintz (forthcoming) have recently suggested another option: a tax on corporate dividend payout. In principle this option would allow us to earn tax revenue at the expense of foreign treasuries without creating a disincentive for foreign investment, as under a conventional CIT. This approach deserves further study and attention.

Chapter 6

1 The assumption of no consumption component is maintained throughout the chapter. If one believes that the consumption component is important, then certain tax provisions that are otherwise required for efficiency in human capital accumulation, such as deductibility of direct schooling costs, may actually encourage too much demand for education.

2 Purchased inputs would be considerably more important if individuals had to bear the full social costs of education and training. Typically, purchased inputs are subsidized at very high rates. This point is of some importance in discussions of education and training policy, but not if the goal is to explain the behaviour of individuals subject to the current regime.

3 In the present context, this declining rate of return must be due to decreasing marginal returns to schooling time. Such decreasing returns appear plausible, at least over some range.

4 The effect may be gauged by comparing the situation where the human capital investment plan does not change with that where adjustment is allowed. The difference between the two cases is a rightward shift of the effective budget constraint, accompanied by an

increase in E_1 and a decrease in E_2. The rightward shift raises planned consumption in both periods, assuming consumption is always normal. But this will require an increase in first-period savings sufficient to offset the decline in second-period earnings and provide for the increase in second-period consumption. Note the interesting result that while Summers' human wealth effect (discussed in Chapter 4) is strengthened in the sense that saving increases *a fortiori*, it is weakened in the sense that the reduction in human capital due to the increase in the interest rate is reduced.

5 To see this, take a selection of points on the no-tax locus. In each case the corresponding post-tax earnings combination is τE_1, τE_2, (where τ is the tax rate), and it will lie a fraction τ of the way down from the no-tax locus along a ray drawn to the origin. The points obtained in this way trace out the post-tax earnings locus described in the text.

6 This provides a measure of how much investment is taking place from a social point of view. From the private viewpoint the extent of investment is measured by the loss in post-tax earnings.

7 Note that we need not specify the time path, or other characteristics of the government's revenue requirement, for this analysis. We are simply examining the situation of an individual subject to a tax system that gives us τ_1 and τ_2. The overall tax structure is determined by the interplay of the government's revenue requirement and the distribution of earnings among the population as a whole.

8 Note that, for the sake of comparability with the wage tax case, tax rates here are expressed on a tax-inclusive basis. A tax-exclusive basis is quite often used instead for an expenditure tax.

9 Since the slope of $GB'H' = -(1 + r)[(1 - \tau_2)/(1 - \tau_1)]$, it equals $-(1 + r)$ whenever $\tau_2 = \tau_1$. With marginal tax rates increasing monotonically with income, this only occurs on the 45° line, where taxable income is the same in both periods.

10 A further complication is that observed earnings differ from full *potential* earnings due to the use of some time in learning instead of earning. The steady decline in the fraction of time spent learning gives observed earnings an added tendency to increase and delays the time at which observed earnings begin to decline beyond the point where net investment becomes negative.

11 This is clearly true for the main group involved in human capital accumulation, that is, the young. Some human capital investment is, however, oppositely affected. For those approaching peak earnings capacity, for example, and for all those past the peak, future marginal tax rates will either be entirely below the current marginal tax rate or will be so "an average." This is an interesting effect, leading to a prolongation of human capital investment and a less humped age-earnings profile, but it is likely quantitatively less important than the discouragement of human capital formation among the young.

12 Estimates of the latter elasticity mainly lie below unity, and values as low as 0.25 have been regarded as plausible in some studies. See, for example, Auerbach et al. (1983).

13 The change in the path of human capital accumulation does not represent a "distortion." In general, lump-sum taxes, which are always efficient (i.e., "nondistortionary"), will affect some form of behaviour.

14 Again, note that this change in human capital accumulation does not indicate any loss of efficiency.

15 It may also induce intertemporal substitution in household production if the share of time costs in household production costs varies over the lifetime. For example, if time costs are relatively more important in middle age due to high wage rates, substitution towards more household production in youth and old age may result. If the elasticity of substitution between goods and leisure in household production equals unity, however, this effect is absent since the share of time in total cost is constant.

16 Note that the income tax, in reducing the after-tax rate of interest, itself makes it more likely that marginal benefits will *rise* in response to the change in the time path of leisure time. Still the rise will be greater for later investments, so that the reduced concentration of human capital investment in early years is a robust prediction.

17 Recall the earlier discussion in which we pointed out that the time path of consumer expenditures (purchases of goods) would be hump-shaped if the elasticity of substitution in household production exceeded the intertemporal elasticity of substitution in consumption. With a hump-shaped time path for goods, the progressive expenditure tax will raise the relative cost of household output in those periods where goods inputs are larger, as long as the share of goods in total costs in those periods is not smaller. The latter condition is enforced by the Cobb-Douglas assumption.

18 That there seems to be a larger effect of allowing endogenous labour given endogenous human capital indicates significant interaction effects along the lines discussed in the previous section. The excess burden of the labour/leisure distortion is compounded by an induced reduction in human capital investment below its optimal level, which inappropriately cheapens time further than the 10 per cent caused by the income tax.

CHAPTER 7

1 This is subject to the qualification that there may be a loss of revenue due to the integration of CIT and PIT. Recent work suggests that the net tax burden imposed by the nonintegration of CIT and PIT in Canada is, however, not as large as is often believed. See Boadway et al. (1984).

2 This statement supposes that uniform income, consumption expenditure, and wages are all monotonically increasing as income (however defined) rises. Also, it is assumed that any schedule of non-negative tax rates is admissible.

3 The expenditure tax rates are reckoned here on a tax-inclusive basis.

4 The top-income group paid taxes of $7,403 on average. This is 16.5 per cent of income. With average consumption expenditure of $21,205, the tax-inclusive consumption base for this group would be $28,608. As a fraction of this base, the $7,403 required tax is 25.9 per cent.

5 In no case does the average tax burden for one of Smith's eight income classes over $10,000 rise or fall by more than 7.5 per cent. Burdens in the middle range increase – for example, for income in the $25,000–$35,000 range there is a rise of 7.4 per cent – and burdens at the top decline – for example, tax paid by those with income over $200,000 drops by 2.5 per cent – but the magnitude of these changes is small compared with those widely expected in a move to the flat tax. See Smith (1984), Table 7, p. 287.

6 It should also be noted that in Smith (1984) there is no adjustment for the exclusion of imputed rent on owner-occupied housing. This is an item that bulks largest, as a percentage of income, for middle- rather than high-income groups.

7 This is a standard result in evaluations of flat-tax proposals in the United States. See, for example, Pechman and Scholz (1982) and Slemrod and Yitzhaki (1983).

8 Some indication of the possible extent of such changes is given by data from the Department of Finance (1981, Table 4, p. 8). These show, for example, that in the income range $30,000-$50,000 the proportion of income paid in federal tax varied from 0 to 30 per cent. While 51 per cent of the taxpayers in this income class were in the modal group where 15 to 20 per cent of income was paid in federal tax, 4 per cent paid less than 5 per cent in tax, and 6 per cent paid more than 20 per cent. Two thousands taxpayers with income over $100,000 paid less than 1 per cent of their income in federal tax. These data are not as instructive as they might be since "total income" in this source does not correspond to true economic income.

9 While a smaller reduction in progressivity certainly makes WT and CT look better, a smaller increase in progressivity under UIT may do the opposite. Some may advocate the UIT reform, despite an acknowledgment of its inferiority on efficiency grounds, mainly because of the increase in progressivity that it promises. If this turns out to be small, in a lifetime context, then the purpose of the reform is undermined.

10 While the simulation model that generates the data in Table 7-4 is grounded in actual Canadian cross-section data, it is parameterized with reference to current empirical evidence, and reproduces many features of Canadian saving behaviour very well, it should be noted that it puts together *synthetic* lifetime histories for households. Longitudinal data were not available for this exercise. The results of this simulation should, therefore, be considered illustrative.

11 Note that capital income is not a *component* of lifetime income. Nonetheless its relative importance for different deciles can be assessed by dividing discounted capital income received over the lifetime by discounted lifetime income.

12 Note that AKS actually considered a pure annual consumption tax in which the base is consumption services rather than expenditure. The latter, which corresponds better to tax reforms that might actually be implemented, would impact less severely on the old since they receive considerable services from durables but spend relatively little on such items.

13 In the UIT case the after-tax interest rate does not change. It is then clear that if the after-tax personal income actually received as a result of business ownership falls, the capitalized value of the net future income stream will decline if the total tax wedge on business income exceeds the rate of interest income, which is the taxpayer's "correct" marginal tax rate. In the CT case the relevant discount rate becomes equal to the former before-tax rate of interest. If the stream of business income did not change, this increase in discount rate would lead to a drop in capitalized value and a capital loss. However, the stream of net business income will increase due to the removal of the corporate and personal tax burdens on capital income. Thus if the total tax wedge for business income was excessive, a capital gain will occur, while if the tax wedge for business income was less than that for interest income a capital loss will be experienced.

14 With an investment that only has a life of five years, the change in the relevant discount rate has relatively little impact on the value of the investment, compared with the impact of the doubling in each year of the net profits which are being discounted.

15 The value of debt will decline not only relatively but absolutely under CT reform if interest was not previously deductible. Thus the burden of mortgage and consumer debt characteristic of the lower-income groups will decline relative to the debt of higher-income groups, much of which is taken out to finance investment and is currently deductible. (Under CT interest deductibility is removed, offsetting the discounting effect on debt where interest was previously deductible.)

16 These results fail to go through in certain cases, as outlined by Feldstein (1974*a* and 1974*b*).

17 Recall that CIT could in principle either be abolished or integrated with PIT in the implementation of any one of these reforms. Abolition of CIT of course may make investment in Canada more attractive to foreigners, while integration has no such effect. (It should also be recalled that our power to make investment in Canada more attractive for foreigners may be reduced by the operation of tax credit mechanisms in the foreigners' home countries. See Chapter 5.)

18 See, for example, Purvis (1985, p. 730) who states: "The country that reforms its tax treatment of capital income without regard for international capital flows or that ignores such tax reforms abroad does so at its own peril. Further ... it is virtually useless – at least in the short run – to try to stimulate investment by giving preferential tax treatment to saving."

19 This picture does not alter much if we allow earnings to be endogenous. It is true that there will be less

investment in human capital, in general, due to the higher discount rate. However, those more efficient at human capital accumulation will still go to school longest and receive their earnings on average later. They will therefore still be relative losers from the higher discount rate.

CHAPTER 8

1 As discussed in Chapter 3, the expectation that amounts remaining in registered form on death would be taxed would induce taxpayers to transform assets intended to be bequeathed into nonregistered form gradually over the lifetime. For taxpayers in the top marginal tax bracket this would, of course, be unnecessary. (Also, if a system of general averaging was in force these portfolio changes would be less important.) While it might appear that this procedure implies very high tax rates on bequests, it actually differs little from current practices. Amounts left in registered assets are now taxed on death (except for interspousal transfers).

2 The latter observation is not inconsistent with high positive skewness in the distribution of inherited wealth, since the distribution of assets is itself very highly skewed.

3 Whether the accumulation of "interest" on inherited assets should be considered part of transfer or life-cycle wealth is not entirely clear. In contrast to Kotlikoff and Summers, Wedgwood (1929), for example, viewed it as self-evident that the accumulation of this interest represented an act of saving on the part of the *current* generation and should not be counted as inherited wealth. This makes a considerable difference in the computations, as noted below in the text.

4 The requirement for a $70 billion flow is based on a 1 per cent gap between the real net rate of return and the natural growth rate of the economy, as estimated from U.S. time series over the period 1910-74. If the true gap were actually 2 per cent, the required flow would only be $46 billion.

5 Difficulties with the rate of return data appear less serious. A number of alternative series are used, and the results are quite robust. One possible difficulty may be that rates of return could be higher for households with a higher propensity towards life-cycle saving. Such an interaction could increase the volume of life-cycle wealth significantly, as recognized by Kotlikoff and Summers (1981, p. 726).

6 A relatively mild perturbation of the consumption profiles more than doubled life-cycle wealth (Kotlikoff and Summers' LCW2 concept, 1981, p. 726).

7 Wedgwood studied two samples. The first consisted of persons dying with estates worth more than 200,000 pounds; the second included decedents leaving between 10,000 and 200,000 pounds. If parents are considered wealthy if *they* left over 10,000 pounds, 67 per cent of the wealthiest sample had wealthy parents, and 52 per cent of the less wealthy sample fell in this category. See Wedgwood (1929, pp. 139 and 153).

8 If there are more than two generations, the same analysis can be applied, but the utility function would depend on R_2, rather than on C_2, where R_2 is the sum of earnings and inheritance received by children. While lacking the formal elegance of a model where the C_i of all generations enter the utility function, this formulation produces a tractable analysis. Note that although the *parent* chooses C_2, the child happily goes along with the decision since he is selfish and will simply consume anything he is given.

9 From equation 8.3 we know that the ratio C_2/C_1 equals $(1 - \theta)(1 + r)/\theta$ Thus the slope of the ray from the origin passing through point B in the diagram (which locates the desired C_1,C_2) is $(1 - \theta)(1 + r)/\theta$.

10 The income elasticity is $\frac{R_1}{B_1} \frac{\partial B_1}{\partial R_1}$. Since $\frac{\partial B_1}{\partial R_1} = (1 - \theta)$ is constant, and R_1/B_1 is decreasing, the income elasticity of demand for B_1 is declining.

11 One difficulty is that the theory has been worked out in the simple two-generation case where children cannot themselves, for example, make bequests. This is clearly a concern when we begin to look at the real world. However, there is some reassurance in the fact that many of the predictions of the two-generation model are consistent with the multiperiod models surveyed below.

12 Menchik and David employ data based on Wisconsin tax records that include longitudinal records of earnings, as well as the size and disposition of bequests.

13 Note that there is an important possible closed-economy general equilibrium effect. Physical investment in human capital is unaffected, but nonhuman capital formation declines. In a closed economy this would be expected to lead to a lower capital/output ratio, higher rate of return, lower real wages, etc. For a small open economy like Canada's, however, such effects may be unimportant. See Chapter 5.

14 $C_2(=R_2)$ must decline because there is a substitution effect away from C_2, *and* there is a negative wealth effect, which reduces both C_1 and C_2. If there was not much intergenerational elasticity of substitution, and returns to human capital investment declined rapidly, B_1 *could* increase. Although I_2 must decline, this is clearly not the case for $B_1 = I_2/1 + r(1 - t)$.

15 The analytical difficulties of working with these models depend, to a large extent, on the treatment of desired negative bequests. Laitner prohibits these. In a model somewhat similar to Laitner's, Davies (1986) shows that the model is easily solved if negative as well as positive bequests are allowed.

16 Davies "decomposes" the impact of the redistributive scheme into an effect on the intergenerational propensity to bequeath, which is unambiguously disequalizing, and the equalizing effect of the demogrant. The former disequalizing force reflects a lessening of intergenerational consumption smoothing.

17 The explanation for the overshooting is as follows. For the first generation affected by the increase in redistribution, the main effect is the provision of the demogrant. Inheritances are still mainly determined by the rate of intergenerational accumulation that prevailed in the old steady state. Beyond the first genera-

tion the new lower rate of intergenerational pass-forward increasingly comes into effect, however. (Also, aggregate lifetime income declines, reducing the tax base that generates the funds required to pay the [declining] demogrant.)

18 Note, however, that Seidman's use of the equation 8.5 formulation implies an exaggeration of the possible negative effect on bequests, since the discounting effect of an estate tax with respect to the descendant's earnings – similar to Summers' human wealth effect, as discussed earlier – is ignored.

CHAPTER 9

1 If bequests are regarded as consumption by the donor, registered accounts must be regarded as cashed out on death, and amounts inherited must be given the same treatment as other taxable sources of income. See the discussion in Chapter 3.

2 This discussion oversimplifies by ignoring the well-known difficulties which imply that a no-government market economy may not display dynamic efficiency. See the discussion in Chapter 1.

3 This statement is somewhat contentious. It used to be commonly held that the wedges in question could not be removed since the foreign tax credit mechanism, for example, in the United States, ensures that foreign subsidiaries merely pay extra tax abroad when our CIT is reduced. Chapter 5 discusses how this view has fallen into question through the recognition of the fact that the effective tax rate for "mature" foreign subsidiaries is indeed the Canadian CIT rate, and that "immature" subsidiaries benefit considerably from the deferral of U.S. tax liabilities until earnings are repatriated.

4 However, note that, in practice, it is probably easier to incorporate the implications in CT reform – for example, by opting for a cash-flow CIT – than in UIT reform. In the UIT approach, while it is, in principle, not necessary to levy CIT at all, it plays an important role as a withholding tax on corporate-source income. Without CIT, given that taxation of capital gains on an accrual basis is impracticable, shareholders would benefit from a major loophole via deferred taxes on retained earnings.

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